

THE
Malayan Agricultural Journal.

AUGUST, 1938

EDITORIAL.

**Malayan
Pineapples.**

The Report on Pineapples, prepared by Mr. F. Birkinshaw for the International Horticultural Congress at Berlin, and which we reproduce in this number, is a concise statement of the present position of this important industry. The author reviews the history of the pineapple trade and the present condition of the industry in the more important countries of production, thus placing the reader in possession of the salient problems of canned pineapple production and marketing, and the manner in which such problems have been solved.

It is evident that the producers in Hawai and Japan—the two main sources of production outside Malaya—have achieved a state of organization and control which has firmly established the industry in these countries. It is to be regretted that the Malaya trade has been slow to initiate similar action to overcome the disabilities which for some time past have prejudiced her trade.

It is true that the Malayan pineapple trade has co-operated with the local Governments to ensure that the fruit shall be packed under hygienic conditions, and that a graded product shall be marketed. It has, however, been recognised for some time that these schemes, though good in themselves, are not sufficiently far-reaching, and that the marketing difficulties—which recently have become acute—will frequently recur unless there is some reconstruction of the organization of the trade.

We understand that this aspect of the problem is now freely recognised both by factory owners and exporters, and that negotiations are proceeding to organize a selling agency which should prove an adequate protection of the industry, and stabilize the selling price at an attractive figure for the purchaser, while maintaining a fair profit to the producer and canner.

**Poultry in
Malaya.**

There has been a very evident increase of interest in poultry-keeping in Malaya during the past two or three years, due in no small measure, we venture to suggest, to the results of investigations at the School of Agriculture and demonstrations at Agricultural Stations in various parts of the country as well as to the influence of departmental publications in English, Malay, Chinese and Tamil.

It is significant that whereas earlier introductions were chiefly made by private poultry fanciers, the interests of present-day breeders is more largely centred in the production of utility breeds, and it is probable that progress in the improvement of poultry in Malaya will advance more steadily for this reason.

Investigations at the School of Agriculture have added considerable knowledge to various aspects of the subject, in particular housing, rearing and feeding, and in the present number of this journal will be found a further thoughtful contribution on the prices and values of poultry foods in Malaya by Mr. G. E. Mann.

Given a sound knowledge of the principles of animal nutrition it is a comparatively simple matter to devise rations suitable for poultry in all stages of their development, but the selection of the cheapest ingredients to provide a balanced ration is of first importance if the venture is to prove profitable. Mr. Mann shews which of the foods easily procurable in Malaya may be most profitably employed in this connexion and the article should therefore serve as a useful guide to poultry-keepers.

The reader will recognise that the recommendations given are based on prices current at the time of writing the article. Prices vary according to supply and demand and the choice of ingredients at an economic price may therefore also vary. The publicity given to prices and food value of feeding stuffs may in itself influence market prices. Our readers are invited, therefore, to treat this article as a guide rather than a statement of hard and fast recommendations.

Original Articles.

POULTRY FOODS IN MALAYA: PRICES AND VALUES

BY

G. E. MANN,

Principal, School of Agriculture, Malaya.

There is everywhere a general tendency to regard individual foodstuffs as cheap or expensive according to their price and without making any detailed enquiry into their intrinsic value as food. Haphazard opinions may or may not be fairly accurate and opinions based on actual food values are obviously to be preferred. Animal nutrition is so complex that values can seldom be determined with complete accuracy but, fortunately, no great degree of accuracy is essential so long as one is not too dogmatic or hasty in drawing conclusions.

Proteins and Energy.

From the nutrition point of view, the intrinsic value of a given foodstuff depends on what it supplies in proteins, minerals, vitamins and energy; while palatability and freedom from substances which may adversely affect the health of an animal or the quality of its produce must also be taken into account. Considered quantitatively, the two most important ingredients are:—

(a) proteins—which are required for the renewal of tissues destroyed by the wear and tear of life, for building up new tissues associated with growth, and for the creation of produce such as milk and eggs;

(b) energy-producing substances such as carbohydrates and fats—which maintain the body temperature and provide energy for movement.

Not all the proteins and energy so supplied are actually utilized by an animal; a portion, however small, is rejected in the faeces. There are ways, however, of ascertaining with fair accuracy what proportions of protein and energy can be assimilated and the results of such investigations have been recorded, each type of farm animal having its own tables of digestible nutrients. Those employed herein refer only to poultry. Energy may be expressed either as calories (indicating the amount of heat which the material can liberate) or as starch-equivalent (indicating the fat-producing power of the material in comparison with that of an equal weight of pure starch). The latter method is closely related to the former and is adopted in this article, which is inspired by a similar study by E. T. Halnan in England (1).

Basic Values.

Judging from recent statistics, the energy-producing foodstuff which commands the steadiest price in this country is the cereal padi (unhusked rice) the average price of which at the mills in Krian is about \$2.00 per pikul (= 150 cents per 100 lbs.). As a correspondingly steady source of proteins, the author has chosen groundnut cake the average price of which (ex mill in Singapore) is about \$3.12

per pikul (=234 cents per 100 lbs.). From these prices and from a knowledge of the average proportions of digestible protein (D.P.) and starch-equivalent (S.E.) which these two foods supply, the price per unit weight of proteins and energy can readily be calculated.

Thus, let 1 lb. of digestible protein cost x cents

and let 1 lb. of starch-equivalent cost y cents.

Then 100 lbs. whole padi, costing 150 cents and supplying on average 6.7 lbs. D.P. and 68 lbs. S.E., cost $(6.7x + 68y)$ cents;

and 100 lbs. groundnut cake, costing 234 cents and supplying on average 38.3 lbs. D.P. and 77 lbs. S.E., cost $(38.3x + 77y)$ cents.

Therefore $6.7x + 68y = 150$

and $38.3x + 77y = 234$

whence $x = 2.1$ and $y = 2.0$

In other words, basing one's judgment on the relatively steady prices and analyses of whole padi and groundnut cake, average prices at the mills are 2.1 cents per lb. for digestible protein and 2.0 cents per lb. for starch-equivalent.*

These unit *prices* may now, for purposes of comparison, be regarded as unit *values* so long as due allowance is made for (a) quality and (b) source of supply.

Quality.

By "quality" is meant in this place not so much freshness and cleanliness as the existence of any special nutritional virtue or objection which a foodstuff may possess. For example, the proteins of milk are of far greater biological value than those of maize. Again, yellow maize is in most circumstances superior to white maize because the former supplies appreciable quantities of the health-promoting vitamin A. White cargo bran and polishings are similarly preferable to the par-boiled varieties in that the latter have lost most if not all of their vitamin B in the process of manufacture. Such advantages and disadvantages must obviously be taken into account when comparing prices although it is seldom possible to value them definitely in terms of money.

Source of Supply.

It has already been stated that the prices of padi and groundnut cake employed in this article are prices at the mills (in Krian and Singapore respectively). Purchasers elsewhere have to pay freight if they obtain their supplies direct from the mills. If, however, it suits their purpose better to buy from a local merchant (as is usually the case when only small quantities are required) the merchant has already paid freight and is entitled to recover it from the buyer. The merchant is also entitled to make a profit on the transaction for he has to provide labour and storage and he runs the risk of loss through depreciation. For poultry foodstuffs in Malaya, a fair average allowance for freight would appear to be about 25 cents per 100 lbs. What constitutes a fair middleman's profit is a more difficult question but 25 per cent of the cost price, excluding freight, is probably reasonable.

* Corresponding prices in England based on wheat and fish meal, are about 8.5 cents per lb. for digestible protein and 4.5 cents per lb. for starch-equivalent.

A further allowance for freight ought possibly to be made in the case of foodstuffs such as wheat and fish meal which are imported from overseas. No attempt, however, is made to allow for this in the present article. It is assumed for the purposes of this article that it is desirable to encourage the production of as much food as economically possible within the boundaries of this country; and this means that local stock must be fed on locally grown or produced materials of the cheapest nature consonant with efficiency.

Comparative Values of Poultry Foods.

Based on the above considerations, the accompanying table has been constructed to effect a comparison between average prices and values of a number of materials which are or could be employed as poultry foods in Malaya. Allowance has been made for local freight and middlemen's profits wherever the prices quoted are those of merchants, not producers. The most important column for study is column 6 which indicates as a percentage the relationship between prices and values. Figures around 100 indicate that the foodstuff is fairly priced; figures below 100 indicate that it is cheap; figures well above 100 indicate that the foodstuff is expensive when considered solely as a source of proteins and energy.

Discussion.

The basic values employed herein are derived from the prices of locally produced padi and groundnut cake, which have been selected because they are two of the commonest sources of proteins and energy respectively in this country and because their price and composition are reasonably steady.

Among other poultry foods in Malaya, cereals and their by-products may be considered first. It is not surprising to find that the price of wheat and oats is considerably in excess of their intrinsic value as they are imported from abroad and are intended for horses rather than poultry. Oats are claimed to have a special value for horses although it is not known wherein this virtue lies; but this does not apply to poultry and neither wheat nor oats can therefore be recommended for fowls in this country as they are uneconomic. Maize also is mainly an imported foodstuff; its price exceeds its calculated value by some 50 per cent. which cannot be justified by the fact that yellow varieties are a moderately good source of vitamin A. The quality of imported maize is often poor and there would appear to be plenty of scope for extending the production of this very useful foodstuff in Malaya, provided that sales could be effected at about two-thirds of the present price. Broken rice is employed fairly extensively as a poultry food; it sells at slightly more than its calculated value but allowance may be made for the fact that its use obviates to some extent the necessity of crushing or grinding whole padi. It is of particular use in the feeding of young chicks for which whole padi is unsuitable as it is liable to cause digestive disorders. Both polished and parboiled rice appear to be expensive, but it should be remembered that they are essentially articles of human diet and that their price is dependent on that of imported rice. They are seldom purchased as poultry food but, in most households, a certain amount of

cooked rice is usually left over after a meal and is often fed to chickens. Rice bran shews a surprising difference between present price and value, even when allowance is made for the fact that the white cargo variety is an important source of vitamin B₁, a deficiency of which leads to nervous disorders, paralysis and ultimately death. Until about two years ago, white cargo bran ex mill cost only 75 cents a bag instead of \$1.25 as at present and at the former price was quite reasonable. Parboiled bran rightly commands a lower price in that its vitamin B content is negligible. White rice polishings, another valuable source of vitamin B₁, might well merit a somewhat higher price than at present if only it were more coarsely ground; most samples are so floury that it is difficult if not impossible to use them in any appreciable proportion without spoiling the texture and hence the palatability of poultry mash.

Turning to cakes and meals, groundnut cake is not only one of the cheapest but is one of the best protein concentrates available in Malaya and its use as a poultry food might well be considerably extended. It is a constituent of all rations recommended by the School of Agriculture for fowls kept in pens and its use in even larger proportions than that adopted at present may be economically advisable. Definite recommendations on this point, however, must wait until controlled feeding trials have been carried out locally to ascertain how far the proteins of groundnut cake must be balanced by proteins of animal origin rather than by mineral substances, for investigations in England and America have led so far to very conflicting results. The use of gingelly and soya bean cakes for poultry cannot be recommended while prices remain at their present levels. The latter is similar to groundnut cake in composition while the former possibly owes its high price to the fact that it is very popular among the Indian cattle-owners in this country. Copra cake, however, sells at somewhat less than its calculated value and more use could probably be made of this material, especially in rations for growing stock and table birds where the proportion of proteins does not need to be so high as in the case of young chicks and laying hens.

Fish meal and whale meat meal, both of which are imported, are expensive. As indicated above, their proteins are possibly of better biological value than those of groundnut cake and fish meal of good quality finds extensive use in poultry foods in temperate countries. In spite of its animal proteins, however, whale meat meal has given very unsatisfactory results with young chicks (2). There would appear to be at least a *prima facie* case for the manufacture of fish and meat meals in Malaya. The author understands that serious obstacles exist at present which would probably prevent the local production of fish meal on any considerable scale, while practical investigations by an ex-student of the School indicate that small-scale efforts could probably not compete with imported material. The possibilities of a local meat meal industry, however, would appear to be more promising, particularly in a densely populated locality like Singapore.

Dried skim milk and unextracted yeast both command large and at first sight exorbitant prices, even when allowance is made for the fact that they have to be imported; but the special virtues of these two foodstuffs, which are closely inter-

Poultry Foodstuffs in Malaya; Comparative Prices and Values.

ITEM.	(1) D.P. (per cent.)	(2) S.E. (per cent.)	(3) Average Price	(4) Calculated Price per 100 lbs., less freight and middlemen's profit.	(5) Calculated Value per 100 lbs.	(6) Ratio of Price to Value (per cent.)	(7) Remarks re Column (3)
CEREALS AND BY-PRODUCTS	Rice, unhusked (padi)	6.7	\$2.00 per pikul	150 cents	150 cents	100	At Mill, Krian
	" broken	6.4	\$4.90 " 170 kati	216 "	187 "	116	Ex " "
	" polished	7.0	\$6.60 " 170 kati	292 "	189 "	154	" " "
	" parboiled	5.0	\$6.55 " 170 kati	289 "	184 "	157	" " "
	Maize	7.0	\$4.50 " pikul	250 "	165 "	152	" Merchants, K.L.
	Oats	6.7	\$5.00 " 100 lbs.	380 "	130 "	292	" S'pore
	Wheat	11.7	\$8.00 " pikul	460 "	179 "	257	" K.L.
	Barn, rice, white cargo	4.4	\$1.25 " 75 kati	123 "	67 "	185	" Mill, Krian
	" " parboiled	5.3	\$1.05 " 75 kati	106 "	75 "	141	" " "
	Polishings, rice, white cargo	9.2	\$2.35 " 100 kati	176 "	181 "	97	" " "
CAKES AND MEALS	" " parboiled	11.9	\$2.35 " 100 kati	176 "	201 "	88	" " "
	Cake, copra, pressed twice	13.2	\$2.00 " pikul	150 "	180 "	83	" K. Selargor
	" gingly	23.7	\$5.25 " pikul	295 "	184 "	160	" Merchants, K.L.
	" groundnut	38.3	\$3.12 " pikul	234 "	234 "	100	" Mill, S'pore
	" soya bean	34.0	\$5.50 " pikul	291 "	195 "	149	" Merchants, S'pore
	" fish	50.0	\$9.00 " pikul	700 "	219 "	320	" " "
	" whale meat	43.0	\$10.00 " cwt.	694 "	212 "	327	" K.L.
	Milk, dried skim	29.5	\$22.00 " cwt.	1551 "	212 "	731	" " "
	Yeast, dried unextracted	43.7	\$25.00 " cwt.	1766 "	244 "	724	" " "
	Gram, green (kachang iiau)	18.2	\$6.00 " pikul	340 "	172 "	198	" " "
Misc.							

1 kati = 1½ lbs.

1 picul = 133½ lbs.

related, must be taken into consideration. Milk is one of the very few foods in the world in which the proteins can be regarded as first-class; its inclusion in rations for baby chicks has a spectacular influence on growth-rate (2) and, in spite of the expense, is justified in the case of good young stock. High levels of protein in the diet of young animals require, however, to be balanced by correspondingly high levels of the growth-promoting vitamin B₂ which cannot apparently be secured by the use of bran or polishings. For this reason, a small proportion of dried unextracted yeast is almost invariably included in good chick mash. There would appear to be no cheap but efficient substitute for these two materials in Malaya, apart from a return to the natural diet which is available under free-range conditions where the risk of disease more than counterbalances the cost of milk and yeast for young chicks of good pedigree.

Finally, the price of green gram—another imported foodstuff—is again too high for the majority of local poultry farmers. It is, in fact, regarded by Malays as a luxury in their own diet and, in spite of its general suitability for inclusion in poultry mashes, it is unlikely to find general favour at its present price.

Summary.

A method of calculating the value of digestible protein and starch-equivalent in poultry foods is described.

Digestible protein is shown to be worth about 2.1 cents per lb. and starch-equivalent 2.0 cents per lb. Corresponding values in England are about 8.5 and 4.5 cents per lb. respectively.

Average prices and calculated values are tabulated for a number of materials which are or could be fed to poultry in Malaya.

Comparisons drawn between these prices and values lead to the following conclusions:—

- (i) the use of imported cereals is uneconomic;
- (ii) local extension of the cultivation of yellow maize and the manufacture of meat meal would probably be justified;
- (iii) the use in poultry rations of copra cake and particularly of groundnut cake should be extended in order to lower feeding costs; but feeding trials are first required to indicate to what extent a reduction can be made in the use of animal proteins.

Literature Cited.

- (1) "How To Cheapen The Ration"—E. T. Halnan,
Feathered World Year Book, 1938.
- (2) "The Food Requirements of Young Chicks"—G. E. Mann,
Malayan Agricultural Journal, Vol. XXIV, No. 5.

Received for publication 27th June, 1938.

PINEAPPLES.

Report by F. Birkinshaw, Chief Field Officer, for the International Horticultural Congress, Berlin, August 12th to 20th, 1938.

Introduction.

It is generally accepted that the many varieties of the pineapple cultivated for sale either as a fresh fruit or as a canned product owe their origin to the one species, *Ananas sativus* (Lindl.) a native of tropical America.

In common with many cultivated tropical plants, the pineapple exhibits much variation, even though in cultivation the normal method of propagation by slips or suckers is a-sexual. Some of the better forms of the cultivated pineapple produce very few seeds indeed. No variety would appear to have developed seedlessness to quite the same extent as have many cultivated forms of the banana, but it is estimated that in Hawaii less than one fruit in a thousand of Smooth Cayenne bears seeds naturally.

Many of the present cultivated varieties would appear either to have arisen, or have been segregated, during the eighteenth and nineteenth centuries, a period when pineapple growing under glass was fashionable in the gardens of wealthy landowners in Europe, notably in France and England. Both at that time and since, various enthusiasts have attempted a classification of the varieties of the pineapple. One of the first lists was prepared by Munro for the London Horticultural Society in 1835, whilst more recent ones are those of Moise S. Bertoni (1919) and W. A. Wendt (1925). Those interested in this particular branch of the subject should consult either the original publications concerned or the lists reproduced as an appendix in "The Pineapple" a book written by Maxwell O. Johnson and published in Hawaii in 1935.

Climate, Soil and Cultivation.

In considering the requirements of the pineapple in respect of climate and soil it is desirable not altogether to disregard the environment of the species in its native habitat. I have been unable to find any detailed description of the conditions under which *Ananas sativus* grows in nature, but it seems reasonable to assume (as its native habitat is tropical America and the plant belongs to the Natural Order of Bromeliaceae) that it grows in a warm humid atmosphere, is subjected to a heavy rainfall, has decaying vegetation for its rooting medium and grows under high trees which shade the plant from the hot rays of a tropical sun.

The conditions under which the pineapple is cultivated vary considerably in respect of both soil and climate. Soils range from the fairly rich volcanic soil of Hawaii, through the comparatively poor quartzite soils of Malaya to the still less fertile sandy soils of Florida. On the other hand, the pineapple also flourishes in deep peat on the coastal plain of Selangor, Malaya, where more than 8,000 acres are now planted. The variations in climate are not quite so great, the extremes probably being best exemplified by the humid tropical climate of Malaya with an

annual rainfall of about 90 inches and a mean shade temperature of 80°F. and by the climate of Port Elizabeth, South Africa, with an annual rainfall of little more than 22 inches and a mean shade temperature of less than 65°F. The annual rainfall of Hawaii approximates to 80 inches and the mean shade temperature is slightly below 75°F.

In Hawaii, normal cultivation practice is to give the soil considerable tractor ploughing and tillage before planting; to plant at the rate of from 11,000 to 18,000 plants to the acre; to manure the crop heavily with artificial fertilizers; whilst paper-mulching is now a standardized practice which appears to be especially beneficial in areas of low rainfall. Normally it would seem that one plant crop and two ratoon crops are harvested before the plants are uprooted preparatory to replanting. Under these conditions yields of 40 tons of fruit from the plant crop, 30 tons from the first ratoon and 20 tons from the second ratoon crop are not unusual in the areas where the soil is best suited for pineapple cultivation.

Fairly heavy manuring with artificials is also practised in Florida, Porto Rico and Queensland, but has not been the general practice in Malaya or in other parts of the equatorial tropics. In so far as I have been able to ascertain, in no other country have yields of fruit been so high as those given above for Hawaii. A general average for elsewhere appears to be about 10 tons an acre per annum for Smooth Cayenne and less for the Queen pine.

In Malaya, pineapples have been grown almost exclusively in the past as a catch crop between young rubber and only very recently has an attempt been made to establish them as a permanent sole crop, young rubber plantations being no longer available for the continuance of the former practice. Experiments designed to determine the best methods to employ under the new circumstances have given some guidance, but have also served to emphasise fresh aspects of the problem needing elucidation. Adequate control of erosion and the maintenance of soil fertility in a tropical climate with a high rainfall, though of prime importance, is only one aspect of the problem. There are indications that climatic and other factors may make it impracticable to adopt the close planting of Hawaii and this obviously has a direct bearing on the economics of manuring, for one fruit is the maximum that can be produced by a plant at the first crop. Experiments on these aspects of the problem are being conducted at the Pineapple Stations both in Singapore and Johore.

Cultivated Varieties, Selection and Breeding.

Two varieties supply the majority of the pineapples used for canning, namely, the Smooth Cayenne (or Kew pine) grown in Hawaii and Queensland and the Queen pine grown in Malaya and South Africa.

Another variety, the Red Spanish, is the one most commonly grown in Florida, Cuba and Porto Rico, whilst it is stated that in Formosa in 1936 some 4,000 acres were under foreign varieties and 18,000 acres under indigenous varieties. I can only assume that this latter term must refer to varieties that have been long established in Formosa, as opposed to varieties recently imported.

The fruit used for canning in Malaya is known locally as Singapore Canning. Both in Hawaii and Malaya there is considerable variation in size, colour, texture and flavour of the fruit, and in both countries the selection of desirable types for canning is in progress.

One problem connected with this work is to propagate the selected plants sufficiently quickly to supply enough planting material within a reasonable time for use on a commercial scale. The method of propagating from half inch thick transverse sections of the plant stem first practised in St. Lucia, British West Indies, will, therefore, prove of considerable practical value for propagating such selected plants as are found to be amenable to this treatment.

In Hawaii, the marking in the field of undesirable types with the object that they should not be used for propagation appears to be a present normal practice.

The raising of pineapples from seed was practised by gardeners in Europe from 1765 onwards and more recently seedlings have been raised in Florida, Hawaii, Malaya and elsewhere. Such seedlings show remarkable variation, contain a large proportion of freaks and little success would appear to have attended the efforts made to obtain superior varieties from seed collected indiscriminately.

In recent years controlled hybridization between one variety and another and between varieties and species, has been done in Hawaii and on a smaller scale in Malaya. The work in Malaya is as yet too recent to have provided results, but reports from Hawaii indicate that some crosses between Smooth Cayenne and the Queen varieties have produced fruits of a high standard of quality.

Pests and Diseases.

Many and various pests and diseases have been described from time to time as having damaged either the fruit or plant of the pineapple. A summary of such is given in "The Pineapple" by Johnson, mentioned earlier.

Fruit rots, caused by both insects and fungi, occur in both Hawaii and Malaya, but nowhere does the damage to fruits in the field appear to be sufficiently serious to warrant more than the briefest mention here. In countries where pineapples are grown for export as fresh fruits, the matter is obviously of greater importance.

In most countries where pineapples are grown extensively, trouble has been experienced from what is commonly known as "wilt" which is a convenient term for describing an unhealthy appearance of the plant, though the real causes of the trouble are various. The plants cease growth and the leaves turn red, lose their rigidity and wither from the tips downwards. It is common for large areas to exhibit this appearance and the real causative agent has often been difficult to determine and, in some cases, is still undetermined.

A form of wilt present in Malaya is under investigation, the real cause of which is still not established.

Nematode worms have been the cause of a form of wilt to pineapples in Hawaii and elsewhere. Control consists of thorough tillage of land before planting, the growing of plants not subject to nematode attack as a rotation and, in some instances, long following has been practised.

A remarkable practice in connexion with pineapple cultivation in Hawaii is that of periodic spraying with a solution of iron sulphate to prevent chlorosis. The yellowing of the leaves of pineapples in Hawaii was at first thought to be due to manganese poisoning. Investigation showed, however, that the phenomenon, although associated with the presence of unusually large amounts of manganese in the soil, was really caused by a deficiency of iron in the plants. Spraying with a solution of iron sulphate appears now to be universally practised in Hawaii, the strength of the solution used varying from 8 to as high as 30 pounds to 50 gallons of water and spraying in the young stages of growth may be as frequent as twice a month.

Recent Developments with Special References to the Production of Canned Pineapples.

The pineapple is grown throughout the tropics for local consumption as a fresh fruit but the Canary Islanders were probably the first to make extensive shipments of the fruit. At the present time the fruit is exported from Florida and Porto Rico for the American fresh fruit markets; both South Africa and the Azores make shipments to England; Queensland supplies fruits for other parts of Australia; and Hawaii ships a comparatively small number in cold storage to the Pacific coast of America. Whilst considerable improvements in methods of growing, harvesting, grading, handling and the technique of packing and shipment have resulted in the markets concerned being supplied with a much more reliable and higher quality product than formerly, from the nature of things the fresh fruit trade can never develop to anything like the dimensions the trade in canned pineapples has reached.

The chief countries concerned in pineapple canning, in order of present importance, are:— Hawaii, Malaya, Formosa, Australia and South Africa.

The following figures regarding each of these countries in the order mentioned will serve to indicate where development has taken place during the past five years from 1932 to 1936 inclusive, round numbers being used for convenience.

Hawaiian production was five million cases in 1932 and was estimated to be twelve million cases in 1936. The figures for each year are:— 1932, five million; 1933, eight million; 1934, nine million; 1935, ten million; 1936, twelve million cases. The figures for the last three years are approximate estimates and are not taken from corrected returns.

Malayan exports were 66,000 tons in 1932 and 76,000 tons in 1936. The figures for each year are:—1932, 66,000; 1933, 60,000; 1934, 66,000; 1935, 74,000; 1936, 76,000 tons. This is equivalent to about 2,400,000 cases of 48 $1\frac{1}{2}$ lb. cans.

Formosa produced 560,000 cases in 1932 and the estimate for 1936 was one million cases, the 1935 figure being a little short of 1,200,000 cases.

Australia exported 1,500 tons in 1932 and only 782 tons in 1936. The low figure for 1936 is a sudden drop for which I have no explanation, the figures for each year being:— 1932, 1,500; 1933, 1,300; 1934, 2,000; 1935, 1,700; 1936, 782 tons.

The only figures I have been able to obtain for South Africa are for exports to the United Kingdom, which were 200 tons in 1932 and 166 tons in 1936.

The figures given indicate that, in respect of exports, Hawaii, Malaya and Formosa are the most important countries concerned. A brief account of the development and present position in each of these countries will, therefore, form a fitting conclusion to this report and for reasons that will appear, I will treat first of Hawaii, then of Formosa and lastly of Malaya.

Hawaii.—Pineapple planting in Honolulu was mentioned as early as 1809. Smooth Cayenne appears to have been introduced by 1890, but a large scale introduction of this variety from Queensland in 1896 would appear to have furnished the stock from which most of the Hawaiian plants are derived. The variety, Smooth Cayenne, appears to be eminently suitable for Hawaiian requirements. Most of the present output of twelve million cases is consumed in the United States and it has been estimated that less than twenty per cent. of the total production is exported, Hawaii being treated as part of the United States of America for this purpose. Actually the exports of canned pineapples from the United States of America for the fiscal year 1935 to 1936 totalled 526.6 thousand cases, which is very much less than twenty per cent. of the total Hawaiian pack. The Hawaiian Islands contain approximately 90,000 acres suitable for pineapple cultivation, but only the most fertile portion or approximately 45,000 acres is at present used for the crop.

Efficiency appears to be maintained in everything connected with the industry; the factory construction, machinery and management are of a high standard and grading standards are well maintained. Marketing of the product receives the same close attention. With a few minor exceptions the canning companies of Hawaii are members of the Pineapple Producers' Co-operative Association, which was founded in 1932 and in 1935, a fifteen year marketing agreement was reached by the members. At the commencement of each season an estimate is made of the sales requirements for the coming year and each company is allocated its production quota.

Formosa.—The area under pineapple cultivation in Formosa has shown a steady and fairly regular increase from 5,237 acres in 1925 to an estimated acreage of 18,000 in 1936, the official return for 1935 being 16,800 acres.

The production figures show a corresponding increase, although the estimated production of one million cases (each of 36 cans) for 1936 is 16 per cent. below the figure of 1,189,000 cases returned for 1935. Most of the Formosan pack is consumed in Japan, but exports to other countries jumped in 1932 to nearly 30,000 cases as compared with only 3,000 cases in 1931 and has further increased since to 107,500 cases in 1935 and an estimated figure of over 236,000 cases in 1936.

The fact that a reorganization of the industry in 1934 was instigated by the Government and that this has led to an amalgamation of practically the whole of the pineapple industry interests under two controlling bodies, indicates that the Formosan canned pineapple industry is likely to be an increasingly important competitor in world markets. The "Formosan Amalgamated Pineapple Com-

pany, Ltd." and the "Taiwan Development Company" have decided to co-operate, the former being concerned specially with canning and export and the latter with fruit production. The Development Company at present controls about 12,000 acres and intends gradually to bring a further 48,000 acres under pineapples.

Malaya.—The Malayan pineapple canning industry owes its origin to Chinese initiative and Chinese have remained almost wholly responsible for its maintenance and management, although European exporters and shippers have been concerned to some extent in financing the trade.

I have not succeeded in tracing the very commencement of the industry, but it is recorded that pineapples were canned in Singapore as early as 1895.

The variety, "Singapore Canning", appears to be more suited to the climate and needs of the Malayan industry than would Smooth Cayenne, the variety so well suited to Hawaii. In the tropical climate of Malaya the fruit of the latter normally grows to an enormous size, its flesh is inclined to be watery and it never develops the rich golden colour which is such a pleasing characteristic of the best types of Singapore Canning, when harvested at the proper stage of ripeness.

In the past, the Malayan industry has been enabled to maintain its competition in world markets on account of the comparative cheapness of its product, notwithstanding that quality was unreliable and varied.

It was recognized by the Department of Agriculture several years ago that the altered circumstances occasioned by the decline in the planting of rubber would require considerable reorganization of the industry in respect of cultivation methods, factory equipment and management and quality and grading of the product. Cultivation problems have been reviewed earlier in this report. The first important step taken with regard to factories was the passing of legislation in 1934 stipulating certain requirements in respect of factory construction and management and providing for their inspection and the registration only of such factories as conformed to the requirements laid down. This has resulted in a very marked improvement in factory construction, routine practice and general management. Since then, agreement has been reached with the trade on the matters of standardized can sizes and a scheme of grading and legislation to provide for their adoption has been drafted and submitted to the Governments concerned.

The area under pineapple for canning in Malaya has increased considerably of recent years and totalled nearly 70,000 acres in 1936. It is obvious that the increased crop can only be marketed satisfactorily if considerable attention is given to ensure that the quality of the product is maintained at a reliable standard and that any graded product marketed is kept well up to the standards required by regulations.

Summary.

Though *Ananas sativus* in its native habitat of tropical America probably grows under shade in a humid atmosphere and roots in decaying vegetable matter, its cultivated varieties are grown under a variety of conditions in respect of soil and climate.

The varieties most extensively grown for canning are Smooth Cayenne in Hawaii and Queensland and the Queen pine in Malaya and South Africa. Red Spanish is grown in Florida, Cuba and Porto Rico. Chance seedlings exhibit great

variation and contain a high proportion of freaks. Controlled hybridization in Hawaii appears to offer better prospects of obtaining new types of quality. Both Smooth Cayenne and the Queen pine show considerable variation in quality of fruit and selection of desirable types is practised in Hawaii and Malaya; also in Hawaii normal field practice includes precautions for limiting the propagation of undesirable types.

The most serious troubles affecting pineapples are various kinds of "wilt", the primary causes of which are various and sometimes obscure and difficult of determination.

Hawaii, Malaya and Formosa are at present the most important centres of canned pineapple production in respect of world trade and prospects of further development. The Hawaiian industry is characterized by exceptionally heavy yields per acre and by great efficiency in all details. Present annual production is about twelve million cases.

In Formosa production has steadily increased for several years and exports have jumped from 3,000 cases in 1931 to an estimate of 236,000 cases in 1936. The industry was recently reorganized at the instigation of Government and Formosan canned pines are likely to be an increasingly important competitor in world markets.

In Malaya, pineapples, which were formerly a catch crop under young rubber, are now grown as a sole crop. The new problems concomitant with this transition have been the subject of investigation by the Department of Agriculture for several years, in respect of cultivation practice, factory construction and management and grading and marketing of the product.

Bibliography.

1. The Pineapple by Maxwell O. Johnson, 1935, Paradise of the Pacific Press, Honolulu, Hawaii.
2. Supplies of Canned and Dried Fruit, 1936. Published 1936 for the Imperial Economic Committee by His Majesty's Stationery Office, London.
Malayan Agricultural Journal. Various authors.
3. Malayan pineapple industry. Vol. XVIII, page 188.
4. Pineapple cultivation. Vol. XVIII, page 242.
5. Pineapple canning. Vol. XVIII, page 293.
6. The canned pineapple trade. Vol. XIX, page 341.
7. The pineapple canning industry in Malaya (Report of Pineapple Conference). Vol. XIX, page 425.
8. Experimental work in relation to pineapples. Vol. XXI, page 492.
9. Malayan graded pineapples. Vol. XXII, page 379.
10. The Malayan pineapple canning industry. Vol. XXIII, page 471.
11. The application of the exhaust process in the Malayan pineapple canning industry. Vol. XXIII, page 563.
12. Further experimental work on pineapples. Vol. XXV, page 38.
13. Recent developments in the Malayan pineapple canning industry. Vol. XXV, page 270.
14. Pineapple fruit rot in Malaya. Vol. XXV, page 407.

CONDITIONS ON RUBBER SMALL HOLDINGS IN MALAYA

2nd Quarter 1938.

*Prepared by the Economics Branch of the Department of Agriculture,
S.S. and F.M.S., in collaboration with the Field Branch of the Department.*

Rainfall.

Rainfall in April was plentiful, in many districts much above the average for this month. In May precipitation was less plentiful and in most parts of the country drought conditions had already set in before the end of the month. June was exceptionally dry throughout the Peninsula, although in parts of Kedah there were violent storms and squalls during the last week.

Prices and Production.

Prices paid for small-holders' rubber are summarized in Tables I and II, which show the extremes and means of prices recorded at a number of centres in each State.

The price of rubber shewed a downward tendency during the first two months under review but recovered during June. In many instances the fluctuations were due to the price of coupons, as uncoupons rubber was fairly steady at low prices.

The following observations, contained in the Annual Report for 1937 of the State Agricultural Officer, Perak, epitomizes the position which obtains throughout the country in relation to the sale of rubber from small holdings:—

“The practice of selling coupons separately has continued throughout the year and it is evident that they are now generally treated as a separate commodity. Prices vary slightly according to the price of couponed rubber but the greatest variation would appear to depend on the period during the quarter when offered for sale. At the commencement of the quarter there is a concerted movement to sell coupons resulting in a fall in value. Prices usually rise as the quarter advances but fall again towards the end of the quarter when dealers have obtained sufficient to cover their stocks. The usual price ranges between 25 per cent. and 33 per cent. of the couponed product.”

Production of small-holding rubber for the quarter is shewn in Table III, which is prepared from the monthly reports of production, stocks, imports and exports of rubber, published by the Registrar-General of Statistics, S.S. and F.M.S.

Tapping.

With the exception of Pahang where the position was similar to that recorded for the first quarter, and Singapore where the area is negligible, there was a marked increase in the area of small holdings out of tapping. At the end of the quarter

Table I.
Highest and Lowest Rubber Prices Paid by Local Rubber Dealers.
(In Straits dollars per picul (133 1/3 lbs.))

2nd Quarter 1938.

	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore
				APRIL				
Smoked sheet	26.00-18.50	27.00-18.00	28.00-19.00	28.00-18.50	26.00-17.50	26.00-23.50	25.50-18.00	25.00-17.00
Unsmoked sheet	24.50-17.00	24.00-16.50	24.00-16.50	24.50-17.00	23.50-18.00	24.00-22.50	24.00-15.50	24.30-16.00
Scrap	18.00-11.00	18.00-17.00	19.00-14.50	—	—	19.00-18.00	19.00-12.00	20.00-14.00
			MAY					
Smoked sheet	23.00-19.00	26.50-19.00	26.00-19.00	24.00-20.50	24.00-17.00	23.00-21.50	24.50-20.50	24.50-19.00
Unsmoked sheet	24.00-18.00	23.50-17.00	22.00-17.00	22.00-17.00	22.50-16.50	21.50-19.50	22.00-19.00	23.00-17.00
Scrap	16.00-11.00	17.00-16.00	17.00-14.00	—	18.00-17.00	18.50-16.00	17.00-13.00	18.00-14.50
			JUNE					
Smoked sheet	27.00-21.00	27.00-18.00	27.80-21.00	28.00-20.00	28.00-17.00	27.50-23.00	28.50-21.00	27.00-20.00
Unsmoked sheet	28.00-20.00	25.40-17.00	26.30-19.00	25.00-19.00	23.60-18.50	25.50-21.00	26.00-18.00	26.50-18.00
Scrap	22.00-12.00	17.00-15.00	19.00-16.00	—	—	20.50-18.50	23.00-14.00	20.00-14.00

Table II.
Mean of Highest and Lowest Rubber Prices Paid by Local Dealers
at a number of Centres in each State.
(In Straits dollars per picul (133 1/3 lbs.))

2nd Quarter 1938.

	Penang	Perak	Selangor	Negeri Sembilan	Pahang	Malacca	Kedah	Johore
	APRIL							
Smoked sheet	24.83-20.50	23.96-19.91	25.33-22.23	25.71-20.54	23.60-20.20	25.33-23.66	25.15-20.75	23.78-19.99
Unsmoked sheet	23.87-18.25	22.14-17.92	22.93-20.21	23.30-17.60	22.20-19.62	23.50-22.50	23.15-18.37	22.71-18.34
Scrap	15.75-13.50	18.00-17.60	18.50-15.75	—	—	19.00-18.19	18.00-14.00	17.81-15.82
	MAY							
Smoked sheet	22.25-19.75	23.00-20.55	23.17-22.63	23.70-20.80	22.71-20.09	22.83-22.00	22.62-20.75	22.47-20.40
Unsmoked sheet	22.20-19.12	21.45-18.13	20.79-18.79	21.70-18.60	21.70-18.75	21.33-20.17	21.00-18.50	21.10-18.93
Scrap	15.25-13.00	17.00-16.00	16.50-14.50	—	18.00-14.30	18.00-16.83	16.00-14.00	17.20-15.69
	JUNE							
Smoked sheet	26.50-22.00	24.70-21.63	26.50-22.97	25.60-21.50	23.58-20.36	26.77-25.67	27.37-22.62	23.80-21.44
Unsmoked sheet	26.37-20.50	22.91-19.97	23.13-20.80	23.60-19.70	22.03-19.17	24.67-22.83	24.75-20.50	22.72-20.16
Scrap	18.37-14.00	17.00-15.00	18.50-16.50	—	—	19.77-18.67	20.62-16.00	18.56-16.62

Table III.

Production of Rubber on Small Holdings.

(in tons)

	Total First Half-Year 1937	1st Quarter 1938	2nd Quarter 1938	Total First Half-Year 1938
Federated Malay States ...	39,739	17,067	15,683	33,650
Unfederated Malay States ...	37,878	16,749	14,039	30,788
Straits Settlements ...	7,967	3,298	3,000	6,298
TOTAL MALAYA ...	85,584	38,014	32,722	70,736

under review, for the whole of the Peninsula 419,600 acres were untapped, or 33.2 per cent. of the tappable rubber, as compared with 335,100 acres or 26.9 per cent. at the end of the first quarter. Tables V and VI tabulate the results of the quarterly survey and provide a comparison with the previous quarter and last year.

The reduction of tapping is generally ascribed to the continued low price of the commodity, the reduced quota under rubber regulation, and in many districts to the counter attractions of a very heavy fruit crop and to padi planting.

Quoting again from the Perak report for 1937, the author's observations are generally applicable to the present position:—

"The practice of selling coupons without rubber is directly responsible for the majority of the untapped holdings. In many, if not most instances, this rest is beneficial but it has the drawback of contributing to unemployment as in many cases income from employment as tappers largely contributes to the maintenance of the village Malay, who does not own his own rubber. The percentage of returns indicate that there is a tendency to increase tapping as prices rise although the decrease when prices fall is not always proportionate. This indicates that a large number of small-holders have of necessity to continue tapping so long as the product is saleable."

Financial arrangements between owners and tappers have been made in some areas. In Selangor it is reported that under the new conditions payment to tappers is usually 5 cents per kati of dry rubber, two-thirds share to tappers, or half share plus 15 kati coupons per acre tapped. Even so, it is added, returns to tappers are still very low, in some cases being as little as \$3 per month.

Table IV.

Estimated Acreage of Tappable Rubber which was out of Tapping on Holdings of less than 100 Acres at the end of June, 1938.

PERAK					SELANGOR					NEGRI SEMBILAN					PAHANG				
District	Total Tappable area	Total untapped area	Percentage		District	Total Tappable area	Total untapped area	Percentage		District	Total Tappable area	Total untapped area	Percentage		District	Total Tappable area	Total untapped area	Percentage	
Batang Padang	30,187	3,000	22		Klang	16,143	9,800	61		Seremban	23,639	20,300	86		Raub	10,534	2,800	27	
Kinta	38,874	5,400	14		Kuala Langat	23,881	9,100	38		Tampin	21,896	16,400	75		Kuala Lipis	15,457	2,000	13	
Kuala Kangsar	92,166	43,300	47		Ulu Langat	45,012	17,600	39		Kuala Pilah	31,832	14,000	44		Bentong	12,224	3,200	26	
Upper Perak	15,590	10,800	69		Ulu Selangor	31,463	10,100	32		Jelebu	9,097	2,000	22		Other Districts†	40,373	9,700	21	
Larut & Selam	43,132	6,900	16		Kuala Lumpur	20,277	10,300	51		Port Dickson	11,133	8,600	77						
Krian	9,408	7,400	79		Kuala Selangor†	8,417	3,500	42											
Lower Perak*	26,735	10,200	38																
Diindings	9,873	7,900	80																
	271,005	99,900	38			145,193	60,400	42			97,597	61,300	63			84,588	17,700	21	
MALACCA					PENANG & P. WELLESLEY					SINGAPORE					JOHORE KEDAH				
District	Total Tappable area	Total untapped area	Percentage		District	Total Tappable area	Total untapped area	Percentage		District	Total Tappable area	Total untapped area	Percentage						
Central	14,093	9,700	69		North	3,549	500	15		Singapore	20,115	400	2			350,007	91,000	26	
Alor Gajah	30,838	3,100	10		Central	10,735	3,600	33								102,126	29,600	29	
Jasin	25,286	6,800	27		South	8,936	6,900	77											
					Penang	15,822	1,700	11								2,916	27,000	33	
	70,217	19,600	28			39,092	12,700	32								4,133			
																29,836			

The percentage of areas out of tapping in March, 1938, was as follows:—Perak 25, Selangor 31, Negri Sembilan 58, Pahang 22, Malacca 22, Penang and Province Wellesley 28, Singapore 10, Johore 19, Kedah 28.

* Estimated from percentage for Kuala Kangsar.

† Estimated from percentage for other Districts in the State.

‡ Estimated from percentage for rest of Malaya.

Table V.

Comparisons of Areas of Rubber Small Holdings Out of Tapping.

		June 1937		March 1938		June 1938	
		Acres	Percentage	Acres	Percentage	Acres	Percentage
F.M.S.	...	104,600	19.4	189,000	31.5	239,300	39.9
S.S.	...	13,200	10.7	28,900	23.1	32,700	25.3
U.M.S.	...	77,500	15.5	117,200	21.8	147,600	27.6
MALAYA	...	195,300	16.8	335,100	26.9	419,600	33.2

Quality of Rubber.

The two most important factors towards the improvement of the quality of rubber appear to be the continued and extended use of smoke cabinets and the exhibiting by dealers of grades of rubber with a public statement posted on their premises shewing the grades and current prices.

While in certain districts price discrimination between smoked and unsmoked is small and therefore unattractive to small producers, in many States the use of these cabinets is firmly established; it is reported in Pahang, for instance, that there are now 236 cabinets, most of which are in use. Further evidence of this growing interest amongst producers of quality of the produce is provided from north Perak where a number of Malays have combined to erect a smoke house 15 ft. high by 7 ft., with a capacity of 700-800 sheets of rubber. In all such efforts to improve the quality of rubber the small-holder is encouraged and helped by the Asiatic Rubber Instructors. Attention is invited to the remarks of the Director of the Rubber Research Institute at the recent meeting of the Agricultural Advisory Committee, a report of which will be found on another page of this issue of *The Malayan Agricultural Journal*.

Assistance in the campaign to encourage the production of a better grade of rubber has come from an unexpected quarter. The Temerloh, Pahang, rubber dealers have jointly issued a circular in English, Malay and Chinese on methods for the preparation of sheet rubber; and also announcing a cut of \$6 per picul for rubber below grade standard.

General Conditions of Holdings.

Isolated instances of budding are reported, but it cannot be claimed that there is any general acceptance of this method of replanting.

Cultivation operations such as weeding are generally neglected, although Krian, Perak, reports that many holdings in that area have been dug or the undergrowth slashed. Holdings in this area in which this work is neglected are usually untapped

areas with damaged trees or holdings with absentee owners. In other areas of Perak several small holdings and larger areas have been cleaned of undergrowth andalang grass, advantage being taken of the dry weather to effect this improvement.

In Pahang, where owing to the hilly nature of some of the rubber land soil erosion may be serious, good propaganda has been continually carried on. Soil erosion damage in Negri Sembilan is said to be less prevalent than formerly as the most usual practice is to allow natural vegetation to become established and to slash it periodically. Elsewhere soil erosion calls for no comment at present.

Diseases.

The position regarding diseases may be considered as satisfactory. Mouldy Rot (*Ceratosomella fimbriata*) was prevalent in most States during the wet weather in April, but the application of suitable fungicides held it in check, and the dry weather during the latter part of the quarter considerably assisted its control. The most serious outbreak appears to have been in North Johore; a considerable quantity of fungicide was sold at cost price by the Department.

Sporadic outbreaks of Pink Disease (*Corticium salmonicolor*) were reported from all States. Treatment was effectively carried out and the dry weather also helped to check the disease.

Oidium Heveae was widespread in south Perak but recovery was complete. A mild outbreak was reported from north and central Johore in April but there were no traces of the disease a month later. Sixteen cases were reported in Negri Sembilan.

Root diseases are fairly general, especially on the old holdings and few owners take any action to combat them.

Economic Position of Small-Holders.

The Malacca report and all reports from Johore make mention of the effect of the present market position on the economic life of small-holders. South Johore report states that small-holders are in a worse plight than they have been for some time and the lack of alternative employment has increased their difficulties. North Johore reports that the average small-holder is worse off than he has been for years. Rubber—in the majority of cases his one and only mainstay—has depreciated below a remunerative level, while the issue of export rights for the quarter was only 50 kati per equivalent acre, representing a decrease from the first quarter of 10 kati per unit area. "With such a decrease in the issue," the report continues, "any benefit likely to accrue from the slightly enhanced price of coupons is immediately counteracted."

Doubtless similar conditions apply elsewhere. The very favourable fruit season throughout the country has temporarily afforded a certain measure of relief to their fortunate possessors, while greater attention has been given to padi cultivation and the production of such products as copra and arecanuts. It must be realized, however, that outside certain extensive areas of padi and coconuts, rubber cultivation still dominates the economic position of the small-holder, and with the low price of rubber and curtailment of tapping, the large majority find themselves in very straightened circumstances.

Miscellaneous.

COCONUT OIL EXTRACTION.

In the enquiry columns of a contemporary trade journal a description was recently given of a method for extracting coconut oil from "Santan" or coconut milk:—

"A fully ripe nut is grated and the gata† obtained by squeezing the meat with the least amount of water possible diluted in the ratio of 1 part of pure gata to 3 parts of water. This is allowed to stand for 48 hours and organisms found in the scum of the fermenting milk are either used directly or better still propagated in sterile nutrient bouillon. The large-size bacillus, rod-shaped with rounded ends are the ones that give best results.

Ripe nuts are cracked, the meat grated as fine as possible, a small amount of water added and the whole squeezed to get the milk (gata). This gata is next diluted with water in the proportion of 1 part gata and 3 parts water. The diluted gata is then inoculated with the bacteria obtained as above. The container is next covered and allowed to stand. After 15-20 hours a water white oil separates on top and may be syphoned out. The scum layer (between the oil and water layers) may be heated and more oil, although slightly coloured, obtained. The water white oil is free from the usual nutty odor of coconut oil from copra. If only a small amount of oil from 1-3 nuts is desired the isolation of the organism may not be necessary. The gata properly diluted (1:3) is allowed to ferment observing carefully after 15 hours the formation of oil. It should not be allowed to stand more than 25 hours to avoid formation of strong odor in the oil."

This process has been examined, two nuts being used for each experiment, the contained "meats" being sliced on a steel plane, and subsequently grated and regrated. Afterwards the "Santan" was extracted by working and squeezing the grated meat with the least possible amount of water which was then diluted as described.

A determination was first made of the efficiency of this method of extraction. It was found that the residual mush contained 47.8 per cent. of oil (on dry basis). Thus only a little more than half the total oil originally in the meat is released in the form of milky emulsion—Santan.

One batch of this extract was allowed to ferment for 48 hours freely exposed to the atmosphere. A sour-smelling aerated scum developed from which three species of bacteria—two gas-forming and one souring—were isolated in pure culture. After sterilization, three further batches of santan were each separately inoculated from one of these cultures.

In no case did a water-white oil separate, although it was obvious the scum was oily in character. When this scum was removed and heated only a few grams of dark oil separated.

It is obvious that the process has little practical utility, for the yield is unsatisfactory while it is also difficult to check the development of objectionable flavours.

Received for publication 16th June 1938.

† "gata" corresponds to "Santan" or coconut milk.

THE COLONIAL EMPIRE MARKETING BOARD.

The recent past history of Colonial economic development has been one of growing realization by H. M. Government in the United Kingdom of their responsibility for promoting the economic welfare of the Colonial Empire. The creation of the Empire Marketing Board in 1926 was the first organized attempt to promote the marketing of Empire produce with the assistance of Government money and machinery, and the abolition of the Board in 1933 was much regretted by Colonies who had come to realize its value.

As a result of the careful examination of the question by an inter-Departmental Committee, His Majesty's Government have introduced a scheme to promote the marketing of Colonial produce in the United Kingdom and overseas. This scheme is supervised by a board called "The Colonial Empire Marketing Board" of which the Secretary of State for the Colonies is Chairman and which includes representatives of the business world, including the marketing side of Colonial products.

Although the Board is an autonomous body with executive and not merely advisory functions, yet in choosing particular problems to investigate the Board will have to rely at any rate in the early stages, almost entirely on suggestions submitted to them by organized producers, when such organizations exist, or by Colonial Governments and the Colonial Office itself, when producers are not organized. The activities of the Board in its early stages are to be directed mainly towards investigations into methods of marketing of Colonial products and towards the improvement of these methods. It also wishes to consider the promotion of Colonial marketing in the Dominions, as well as in the United Kingdom, European countries and the United States of America. At a later stage the principal functions of the Board will be to help and encourage the producers and distributors concerned to build up efficient marketing organizations of their own.

It appears that the Board is more concerned with minor products than with the major agricultural industries. They hold that such products as cocoa, tea, coffee, sugar, cotton, rubber, and the oil-bearing fruits such as copra, groundnut and palm kernels are established industries for which the Board can do little to alter, improve or extend the markets.

They look rather to a class of "specialist articles, branded articles, goodwill articles; articles the sale of which depends not only upon high quality, but upon the maintenance of that quality and in particular upon the *standardization* of the article so that it will be recognised by all its brand, name or mark."

The Board considers that there is considerable scope for discovering new markets and extending present ones for such products and they hope to make valuable contributions towards improvements in production and marketing as they maintain that methods of production, treatment, packing, handling and shipping can be improved year by year as new methods are learnt and experience acquired.

The address of the Board's office is 2 Sanctuary Buildings, 18 Great Smith Street, London, S.W.1., and the Secretary is Mr. H. C. H. Bull, A.C.A.

Reviews.

The Coconut: A Monograph.

By J. S. Patel, M.Sc. (Cornell), Ph.D. (Edin) Published by the Government Press, Madras, 1938. 313 p.p. Illustrated. Price 3 rupees 12 annas.

The Department of Agriculture of Madras maintains four research stations where for the past eighteen years coconut problems have been studied. The author has checked and correlated the published and unpublished work of these stations and has also referred extensively to the published work of others.

The chapter headings in this monograph are introduction; the culture; the root; the stem; the leaf; floral biology; manuring and cultivation; the yield; germination and selection; the nuts, copra and oil; coconut products; tapping; diseases and pests; and abnormalities of the coconut.

The chapter on culture is good, and those on root system and leaf deal very fully with their subjects. Floral Biology is the largest and one of the best chapters in the book. It deals with the development of the inflorescence, the relationship between spadix and leaf production, seasonal variation and abortion of spadices, pollination and setting of fruits.

Of the particular interest is the chapter dealing with variations in the yield of individual palms. Variations due to age, season, inherent character of palm, and rainfall are carefully examined. The effect of climate and season on the crop is, apparently, even more marked than in Malaya. The author concludes that the rainfall of the year previous to and of the year of harvest is significantly correlated to the yield, but states that he is unable to evaluate any exact mathematical relationship. He also records a significant seasonal variation in the character of the nuts and of the contained coconut meat.

The chapter on germination and selection of seed nuts is also well treated and contains information of interest and value.

In "Manuring and Cultivation" a great deal of information is offered regarding the effects of a number of manurial treatments, but the presentation of results is not always easy to follow. Furthermore the value of the observations must be open to some doubt as there seems to be no adequate system of randomised treatment nor sufficient control plots.

The manurial experiments have been in progress since 1922 at the Kasaragod station, the soil of which is a sandy loam, containing as much as 75 per cent. of fine gravel and coarse sand, according to the table of mechanical analyses on page 166. The soil is, therefore, of a very different nature to the clay soils in which plantation coconut palms are usually grown in Malaya. Manurial experiments were also carried out, between 1922 and 1931, at the three Nileshwar stations, but these are only very briefly reported.

A feature of interest in the chapter is the account of different responses to manurial treatments from heavy, medium, and poor-bearing palms. The importance of cultivation, especially in unirrigated coconut land, is briefly discussed.

The chapter on copra and oil is somewhat disappointing. The method of comparing the oil content of batches of copra by means of chekku oil mill

expressions which is much used by the author is difficult to accept in the absence of any proper examination of the degree of reliability of this method of determination.

The account of nut storage is of interest. In Malaya it is not possible to store nuts for such long periods as in Madras without serious spoilage, and the attempted production of "boll" copra by atmospheric drying of the whole fruit has also been a failure here, due to physiological or environmental causes.

Very brief reference is made to manufacture of copra, probably because in Madras this offers no particular difficulty, since manufacture is mostly confined to the dry season. There is an interesting reference to a trade in edible copra—small cups of superfine white copra for direct consumption—which has no parallel in Malaya. This copra is especially high priced and its production from selected dwarf palm nuts might reasonably be considered.

The section on coir production is most informative and it is interesting to learn that no less than 25,000 people are engaged in this industry on the West Coast. In Ceylon, where both bristle and coir yarn are produced, the industry is carried on in central factories, whereas in Madras it is a cottage industry and coir yarn is mostly the product.

There is also a long and interesting account of investigations into the production of toddy and jaggery and of the effect of tapping on the subsequent production of nuts.

The monograph contains a mass of information, and although in a few places dwarf palms are unsuitably referred to, and in some instances the information is not too well correlated, the book is a very acceptable addition to the literature on the coconut palm and should become a useful book of reference both for the practical agriculturist and for the research worker.

There is an extensive bibliography of nearly two hundred references to published work up to the end of 1934, and a good index.

R.B.J. AND F.C.C.

The Frameworking of Fruit Trees.

R. J. Garner and W. F. Walker. Occasional Paper No. 5 Imperial Bureau of Horticulture and Plantation Crops. 1938. pp. 19, bibl. 26. Price 1 shilling.

The authors set out briefly, the results of practical orchard experiments in Tasmania, England and elsewhere, on methods of topworking and thereby changing the variety of fruit trees at will.

The method commonly accepted in the past has consisted—to put it somewhat crudely—in chopping off the top of the tree and inserting one or two grafts into the stump, or into not more than the two or three branches which remain.

The method which they describe consists essentially in the insertion of a very large number of grafts right out at the ends of all the smallest branches. The labour involved is very much greater but the return of the tree to productivity is also greatly accelerated and would appear to make the practice worth while.

Four ways of carrying out the operation are described, namely, stub-grafting, inverted bark-grafting and awl-grafting. Line drawings greatly facilitate an understanding of the methods, while photographs showing an apple tree immediately after treatment and another similar tree two years after treatment demonstrate the results which can be expected.

Possible difficulties, choice of grafting wax, costs and other practical points are fully discussed.

Malayan Agricultural Statistics 1937.

D. H. Grist. Special Bulletin, Economic Series No. 9. Department of Agriculture, S.S. and F.M.S., 1938. Price \$1/- (Straits Currency).

This seventh annual summary of Malayan agricultural statistics gives data up to the end of 1937.

The volume consists of 95 tables and 2 graphs and includes all available statistics concerning the Malayan areas, production, imports and exports, and market prices of such tropical crops as are grown in the Peninsula, or which at least theoretically although perhaps not economically, might be grown in this country.

The present publication follows the lines of its predecessors with certain modifications and additions, chief of which are tables showing the gross exports during the past few years to the principal importing countries of the major agricultural products of Malaya.

The volume furnishes a useful summary of local information regarding agricultural conditions in a convenient form for easy reference.

Annual Report for 1937 of The Rubber Research Institute of Malaya.

*Published by The Rubber Research Institute, Kuala Lumpur, F.M.S.
July, 1938, 211 pp. Price \$1 (Straits currency.)*

This volume consists of the Director's report, which covers 55 pages, the reports of the four Divisions of the Institute *viz.* Soils, Botanical, Pathological and Chemical, and the report of the Manager of the Experiment Station. Sections of the book are also devoted to the Report of the Board, Report of the London Advisory Committee for Rubber Research (Ceylon and Malaya), and a Statement of Accounts.

Information concerning the research investigations is confined to the reports of the Branches. The Director's report is devoted to an exposition of the policy of the Institute and the means by which this policy is being put into effect, while the lines of future developments are indicated.

The report is a model of its kind in that a clear-cut picture is given of the policy and activities of the Institute. It shows that not only is long-rang experimental work carefully devised, but the results of the work of the scientific staff will be made available to every class of rubber cultivator in the country.

Departmental.

MEETING OF THE AGRICULTURAL ADVISORY COMMITTEE, 13th JULY 1938.

A meeting of the Agricultural Advisory Committee was held at the Department of Agriculture, Kuala Lumpur, on 13th July 1938, when in addition to a number of interesting discussions, several important statements were made defining the agricultural policy and outlining the schemes by which the policy will be put into effect. The following notes, drawn from the minutes of the meeting, concern the more important matters discussed.

Freight Rate on Copra.

The Chairman reported that the United Planting Association of Malaya has been informed officially that the basic freight rate on copra from the Straits to Shipping Conference ports in Europe from July 1st, 1938, will be as follows:— "Contract" (bags or bulked) 12 cwts. 35/- net; "Non-contract" (bags or bulked) 12 cwt., and "Compressed" (momichests and bales) 52 cubic feet, 44/- net.

The Pineapple Industry.

After referring to the progress made in the erection of the demonstration canning factory and laboratory at Johore Bahru, and to the position regarding standard can sizes, the meeting was informed of the introduction of the Malayan Mark Legislation. This legislation has been passed and published in the Straits Settlements and is now nominally in force in the Colony. It has also been passed by the Selangor State Council and will be published shortly in the Federated Malay States Gazette. In Johore the legislation will be brought up for approval at the next meeting of the State Council at the end of August. It appears that several canners are prepared to make use of the Malayan Mark as soon as the regulations are passed and the Canning Officer has been asked to request packers to prepare consignments accordingly.

Statistical Position. The meeting was informed that packers have petitioned Government concerning the introduction of measures to regulate planting and factory production and the general principles of the proposed scheme was explained.

Anti-Erosion Measures in Malaya.

The Chairman stated that his memorandum to Government on this subject was circulated to members and helpful comments were received from Messrs. Page, Reis and Stanton. He considers that nothing further can be done in this connexion until a reply to his memorandum has been received from Government. The possibility of enforcing anti-erosion measures through existing legislation was discussed, as was also the question whether existing legislation provides for measures to retain soil fertility or only against damage done by silt. It was agreed that nothing can usefully be done until a special board to consider this subject has been appointed by Government.

Tin Tailings and Slimes.

At the Chairman's invitation the Chief Research Officer made a statement on the above subject.

Mr. Belgrave stated that it has long been accepted that even very small quantities of mining slimes are injurious to padi and in consequence very strict control is imposed on mines from which the effluent might get onto padi areas—in general this limit is 40 grains per gallon in the padi irrigation water as opposed to 800 grains per gallon for mines more fortunately situated.

It was decided in 1937 that more exact information was desirable and as a preliminary, an elaborate pot culture experiment was conducted at Headquarters using padi soil and slimes from a mine in Selangor. Slime concentrations of 35-500 grains per gallon were employed. Figures for yield, height and tillering showed that the slimes were beneficial. Pot culture work must always be repeated in the field and in this case repetition is the more necessary in that factors such as speed of flow and aeration may have reversed the effect that would be produced under field conditions.

With the co-operation of the Mines and Drainage and Irrigation Departments an area of 9 acres has been selected at Beranang on which the effect of slime at concentrations of approximately 400 and 200 grains per gallon will be tested against control plots irrigated with uncontaminated water.

Mr. Belgrave added that even if this particular field experiment confirms the pot culture results, the question will not be settled for the whole of Malaya, because slimes differ in their chemical composition—some may contain arsenic and some certainly are calcareous; small quantities of arsenic and large quantities of calcium and magnesium carbonates may or may not injure padi. A systematic chemical examination of slimes from mines in all parts of the country has begun and will be continued.

Tin Tailings. Mr. Belgrave referred to Sir Frank Stockdale's suggestion that experiments with the planting of vitex and cinnamon on old tin tailings might be tried. He said that it has been decided that systematic experiments will be required and before these are undertaken it will be necessary to obtain analyses of tailings in various localities in order to classify their various types. In view of the shortage of staff in the Soils Division it will be necessary to postpone this work for at least another year.

The Chairman stated that this question of tin tailings was raised shortly after his arrival in Malaya and he decided that haphazard, isolated experiments in cultivation of plants thereon were useless, until it became possible to classify the types of soil generally found in such tailings. He added that wherever possible mines are called upon to put a deposit of fine material, *i.e.* "slimes" on top of their tailings by means of paddocking.

In subsequent discussion it was agreed that information on this subject is greatly needed as the question of prospecting for tin in land reserves is affected.

Grading Small Holders' Rubber.

The Chairman invited the Director, Rubber Research Institute of Malaya, to make a statement on this subject. Mr. Page said that it has been decided to explore further the possibility of introducing the price-grading scheme for rubber on the lines of the scheme now working in Pahang, where dealers exhibit in their shops a board showing the latest Singapore prices together with their own prices and samples of the varying grades of rubber. From the results obtained in Pahang the scheme appears to be a promising one. Residents, Resident Councillors and Advisers have been addressed on this question and the scheme is now being tried in parts of Perak and Brunei, Selangor, Malacca and Trengganu. Province Wellesley and Penang are still doubtful about its introduction and measures are being further considered in Johore. The general attitude in Selangor is still unfavourable as is that of Kelantan; but in view of the fact that so much still remains to be done in improving the small-holders' product in Kelantan it is scarcely worth while trying to introduce the scheme there at the present time.

Mr. Page stated that it has been decided to initiate experiments in physical grading. This has so far only been done in one District in Selangor. In this locality the Asiatic Rubber Instructor actually grades on one day a week rubber brought in by small-holders.

The meeting was informed that physical grading of rubber was tried in Muar (Johore) with reasonable initial success, but in order to break down the scheme dealers offered better prices for unsmoked sheet. Another speaker stated that when judging small-holders' sheet at an agricultural show in Province Wellesley recently he found the sheet to be very much better than ever before.

Rubber Instructors—New Appointments.

The Director, Rubber Research Institute of Malaya, reported that following a decision to expand the Small-Holders' Advisory Service, *i.e.* to increase the present cadre to a total of about 50 officers during the next five years, 5 new officers have been appointed. The present cadre of Asiatic Rubber Instructors totals 29, distributed as follows:

Perak	4	Malacca	3
Negri Sembilan	2	P.W. & Penang	2
Pahang	3	Singapore and Johore	6
Selangor	3	Kedah	2
Sungei Buloh Station	1	Kelantan	1
On leave	1	Brunei	1

He added that 3 demonstrators have also been appointed. These officers accompany Asiatic Rubber Instructors and follow up their instructions by several days' practical demonstration in each locality. The results obtained appear fully to justify these appointments.

FROM THE DISTRICTS.

Compiled by the Chief Field Officer from Monthly Reports of Agricultural Officers.

July, 1938.

The Weather.

Over the whole of the western areas drought conditions previously reported continued. Lack of adequate supplies of water has become a problem in many centres.

Conditions in Penang were better and frequent showers in the second half of the month brought the total rainfall to normal. The drought on the mainland was unbroken.

In Negri Sembilan, although the weather has been very dry, showers of rain have done something to mitigate conditions.

In Singapore, precipitation was up to average and in South Johore also showers did something to relieve the drought though the total rainfall was well below average.

Pahang also experienced hot and dry weather but there was some rain and conditions were nearer to normal than in any of the western States.

Kelantan experienced ample and well distributed rainfall throughout the month, the total precipitation being up to average.

Remarks on Crops.

Rubber.—From the 1st of July the quota was reduced to 45 per cent. and results have been quickly noticeable. Coupons are in great demand and have reached a value of \$24 per picul equivalent. Prices of rubber with coupons has appreciated steadily throughout the month reaching a final value of \$32 per picul. Uncoupons rubber is still only worth \$5 or \$6 per picul.

Despite the rise in the price of rubber there does not appear to be an increase in the amount of tapping. This can perhaps be ascribed to the fact that the high price obtainable for coupons makes it unprofitable for small proprietors to employ labour for tapping when the increased return is only some \$6 per picul; and also that many small holders are busy with their padi cultivation.

The rubber grading scheme in Pahang appears to be operating satisfactorily, and dealers are eager to co-operate. Interest among the small holders in the manufacture of good quality sheet is maintained—in south Pahang alone 6 new smoke cabinets were erected during the month, bringing the total in this circle up to 87. It is worthy to note that the Pahang entries swept the board at the recent Malayan Exhibition in Kuala Lumpur.

In Kelantan also many demonstrations of rubber manufacture have been given and propaganda is constantly maintained. As the dealers pay a premium of \$2.50 for good sheet, these efforts are meeting with success.

July 1st saw the inauguration of the new scheme under the Restriction Regulations for the allocation of new planting rights. These rights in the form of 1/20th acre coupons were handed out to small-holders when the quarterly rubber coupons were distributed. Some of the early recipients sold their rights for as little as 50 cents per coupon; \$1.20 to \$1.50 is, however, now being received. There is apparently a lively trade in these rights and Chinese dealers are reported to be buying in large quantities. It is feared that there will not be much new planting done by small-holders as few can resist this opportunity to obtain ready cash.

Padi.—The drought has almost brought cultivation to a standstill in many districts. A number of the irrigation areas have felt the water shortage and even in the old established irrigation areas in Krian the cultivators have shown considerable anxiety and have not been willing to continue planting until they are sure of adequate water.

Padi in the nurseries has been particularly prone to insect attack and such attacks have been difficult to control owing to the impossibility, in a great many cases, of flooding the nurseries.

In Krian the total crop for the 1937-38 season was approximately 570,000 piculs; of this 158,000 piculs (28 per cent.) were bought by Government Rice Mills. About 100,000 piculs (18 per cent. of the crop) of Seraup 48 received the 10 cent bonus.

Coconuts.—The value of copra appreciated slowly throughout the month and at the close had risen by about 30 cents. During the dry weather much sun-dried copra was made.

Pineapples.—In Johore the prices paid for fresh fruit for canning have shown an appreciable increase. Cannery are now paying the following prices for fruit:—

First quality	\$1.80	to	\$2.10	per 100
Second ..	1.50	to	1.70	
Third ..	.80	to	1.00	

This improvement in price is probably due to competition among the cannery to obtain the limited supplies of fruit now available. The price of canned pineapples has not increased appreciably.

In Selangor the prices paid to small cultivators are still only 40 to 50 cents per 100. Estate-grown pineapples, however, received a slightly better price.

Livestock.—Pigs. The live-weight price of pigs reached a new low level record, \$10.50 per picul being recorded from Penang, which compares with \$21.00 paid a few months ago. Large numbers of swine from Province Wellesley are now being marketed in Penang, and supply is in excess of demand. Exports from Penang to Singapore have recently been undertaken and found to be profitable.

Cattle. Cattle occupies a far larger place in the agriculture of Kelantan than in any other State of Malaya. Following the recent tour of the Adviser and Sir Frank Stockdale, the policy of the Department in Kelantan has lately been modified to accord this aspect of Kelantan agriculture the attention it deserves.

The work of laying out the livestock experiment station at Melor and the building up of a foundation herd of cattle is proceeding and mixed farming experiments have been commenced.

Some 300 head of cattle are reported to have died from a disease which has not yet been identified, but it is thought to have been introduced probably from Siam. The disease is reported to be now on the wane.

Kapok.—Although kapok is a well-known tree in many parts of Malaya, little attention is paid to its cultivation. In Lower Perak, however, it is quite an important local industry and four Teluk Anson dealers purchase about 142 piculs per year, all of which is sold in the District. The crop is grown in the riverine mukims on banks and islands of the Perak River.

In Teluk Anson two grades are recognised—cleaned and uncleaned. “Cleaning” consists of breaking up the pods and removing only the larger pieces. At the present time “cleaned” kapok realises \$12 to \$14 per picul and uncleaned \$6 to \$8. The only seedless kapok on the local market is imported from Java. Again there are two qualities selling at 30 cents and 25 cents per kati respectively. The former quality is much superior to the latter one. If local kapok had the pieces of pods and the seeds removed the product would be superior to the second quality imported product

DEPARTMENTAL NOTES.

Demonstration at the Malayan Exhibition, 1938.

The Department of Agriculture staged a demonstration of the use of a hand press for the extraction of palm oil, at the fifteenth Malayan Exhibition held at Kuala Lumpur on July 31st and August 1st and 2nd., 1938.

The description of this press was the subject of an article in *The Malayan Agricultural Journal* of February, 1938.

The demonstration attracted considerable attention, and appealed to visitors by reason of the simplicity, ease of working and low cost of the system. The adoption of this system makes possible the economic cultivation of areas of about 20 acres of palms.

A full account of the Exhibition will be included in the next number of this journal.

The Rural Lecture Caravan in Penang and Province Wellesley.

The Rural Lecture Caravan made a successful tour of Penang and Province Wellesley during the period 18th June to 6th July, 1938. Thirteen localities were visited, and the total attendance is estimated at 15,000.

An innovation was introduced by the inclusion of two Chinese nights in Penang, one at Balik Pulau and one at Sungei Ara, when lectures were given in Chinese on rubber and soil erosion.

The Caravan was present at the Bukit Mertajam (Province Wellesley) Agricultural Show, where unfortunately sufficient space was not available for showing the films; the Caravan exhibits were, however, usefully used for the Departmental display.

Appointments.

Mr. Gunn Lay Teik, Assistant Analyst, Department of Agriculture, S.S. and F.M.S., has been appointed Chemist, Department of Agriculture, S.S. and F.M.S., with effect from 1st. July, 1938.

Leave.

Mr. H. S. Simpson, State Agricultural Officer, Pahang, has been granted 254 days leave from 15th July, 1938, inclusive.

Mr. C. H. Burgess, Agricultural Officer, returned from leave on 29th June, 1938, and assumed duty in the post of State Agricultural Officer, Pahang, on 1st July, 1938.

Mr. H. K. Ashby, Agricultural Officer, Singapore, has been granted 227 days leave from 15th July, 1938, inclusive. Mr. P. V. Ormiston assumed duty in the post of Agricultural Officer, Singapore, on 15th July, 1938.

Mr. N. C. E. Miller, Entomologist, returned from leave on 28th July, 1938.

FERTILIZER PRICES, JULY, 1938.

The following are the prices at the end of July, 1938, of some of the more important fertilizers.

Product.		Analysis				Price per ton \$
		Nitrogen (N)	Phosphoric Acid (P ₂ O ₅)		Potash (K ₂ O)	
			Soluble	Insoluble		
Sulphate of Ammonia	...	20.6	—	—	—	72.75
Calcium Cyanamide	...	20.6	—	—	—	80.00
Muriate of Potash	...	—	—	—	50	112.00
Sulphate of Potash	...	—	—	—	48	112.00
Superphosphate (concentrated)	...	—	39 - 40	—	—	105.00
Superphosphate	...	—	16 - 18	—	—	60.00
Basic Slag	...	—	16	—	—	48.00
Rock Phosphate (Christmas Island)	...	—	11*	38‡	—	33.50
Rock Phosphate (very finely ground Gafsa)	...	—	11*	26 - 28‡	—	40.00
Lime	...	—	—	—	—	20.00

* Citric soluble.

‡ Total.

Quotations are *ex* warehouse, Port Swettenham, Klang, Singapore and Penang, with the exception of muriate of potash which is *ex* warehouse, Port Swettenham, Klang and Singapore.

The above quotations for concentrated superphosphate, superphosphate and Christmas Island phosphate are *ex* warehouse Penang, Port Swettenham and Klang. The Singapore quotations for these three fertilizers are \$95, \$50 and \$31.50 per ton respectively.

Statistical.

MARKET PRICES.

July 1938.

Major Crops.

Rubber.—The steady improvement of prices reported in June continued during July. The price in Singapore opened at 23½ cents per lb. and closed the month at around 26½ cents. The average price for the month of No. 1. X. Rubber Smoked Sheet was 25.11 cents per lb. in Singapore, as compared with 20.27 cents in June. The London average price was 7.44 pence per lb. and the New York price 15.21 cents gold, as compared with 6.06d., and 12.36 cents gold per lb. in the previous month.

Prices paid for small-holders' rubber at three centres during June are shewn in Table I.

Table I.

Weekly Prices Paid by Local Dealers for Small-Holders' Rubber, July, 1938.

(Dollars per picul (133 1/3 lbs.))

Grades	Kuala Pilah, Negri Sembilan				Kuala Kangsar, Perak	Batu Pahat, Johore.		
	7	14	21	28	20	13	20	27
Smoked Sheet ...	31.00	30.00	31.25	—	30.00	—	29.50	—
Unsmoked Sheet ...	29.00	28.11	29.00	30.00	28.00	27.80	—	29.10
Scrap ...	No purchases							

Transport by F.M.S.R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang \$1.24 per picul, Seremban to Singapore \$8.00 per ton.

Transport from Batu Pahat to Singapore by lorry excluding duty, 90 cents per picul.

Transport from Kuala Kangsar to Prai by railway \$6.20 per ton.

Transport from Kuala Kangsar to Singapore by railway \$10.00 per ton (minimum consignment 5 tons).

At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.

At Kuala Kangsar the standard deduction for moisture in unsmoked sheet is 10 per cent.

No purchase at Kuala Kangsar on 6th, 13th and 27th July, or at Batu Pahat on 6th July.

Palm Oil.—Prices improved during the month, as is shewn in Table II. The average of the weekly quotations in June was:—palm oil £13-8-1½ per ton, kernels £8-13-1½ per ton.

Table II.
Prices of Palm Oil and Palm Kernels.

Date 1938.		Palm Oil in Bulk, c.i.f. landed weight Liverpool/ Halifax.	Palm Kernels, c.i.f. landed weight London/ Continent
		per ton	per ton
July	1	£ 14. 0. 0	£ 8. 15. 0
	„ 8	14. 0. 0	8. 17. 6
	„ 15	14. 15. 0	9. 0. 0
	„ 21	15. 0. 0	9. 0. 0
	„ 29	15. 0. 0	8. 15. 0
Average July		£ 14. 11. 0	£ 8. 17. 6

Copra.—The price of copra in July was fully up to the more favourable prices recorded during the latter part of June. Prices shewed but little fluctuations, the highest Singapore quotation for sun-dried being \$3.75 and the lowest \$3.50 per picul. The average for the sun-dried grade was \$3.66 per picul, as compared with \$3.04 in June.

Copra cake remained steady at \$2.10 per picul until the last week of the month, when it dropped 5 cents. Average price in July was \$2.09 per picul.

Rice.—The average wholesale market prices of rice per picul in June were as follows:—Siam No. 2 ordinary \$4.25, Rangoon No. 1 \$3.95, Saigon No. 1 \$3.87, as compared with \$4.16, \$3.90 and \$3.92 respectively in May and \$3.91, \$3.57 and \$3.65 respectively in June 1937.

The average retail prices in cents per gantang of No. 2 Siam rice have remained unchanged throughout the year at Singapore 28, Penang 32, and Malacca 28.

The average declared value of imports during June was \$3.88, as compared with \$3.92 in May and \$3.90 in June 1937.

Padi.—The Government Rice Mills, Perak, paid \$2.10 per picul for padi. Prices in the Districts showed little variation over those ruling during the previous month. In the main rice-growing areas the price was between \$8 and \$9 per 100 gantangs, higher prices ruling in small padi areas, and up to \$14 per 100 gantangs in towns and non-padi producing districts.

Pineapples.—Prices have tended to steady with a slight upward movement on reports of small pack and better enquiry. The following are the average prices per case of 48 tins of 1½ lbs. each:—G.A.Q. Cubes \$2.67, Sliced Flat \$2.62, Sliced Tall \$2.75; Golden Quality \$2.86, \$2.81 and \$2.92 respectively.

The pineapple season was practically at an end and greater competition amongst canners for supplies resulted in higher prices. From 60 cents to \$1.35 per 100 was paid at Singapore factories. In south Johore only 3 factories were working and prices of fresh fruit was per 100 1st. quality \$1.80 to \$2.10, 2nd. quality \$1.50 to \$1.70, 3rd. quality 80 cents to \$1. Negri Sembilan prices were quoted at from \$1.50 to \$2.50 per 100, while in the pineapple growing districts of Selangor the price remained low, being 40 to 50 cents per 100 for fruit from small-holdings and 70 cents per 100 from estates.

Beverages.

Tea.—Ten consignments of Malayan tea comprising 635 packages were sold on the London market during July. Two consignments (144 packages) were upland tea and 8 consignments (491 packages) were lowland tea. The upland tea sold at prices between 1s. 1½d. to 1s. 2½d. per lb., the average being 1s. 2d., while the prices realized for the lowland tea varied from 1s. 0¾d. to 11d., the average price being 11.75d. per lb.

Average London prices per lb. during July for consignments of tea from other countries were as follows:—Ceylon 1s. 2.35d., Java 11.96d., Indian Northern 1s. 1.34d., Indian Southern 1s. 0.95d., Sumatra 10.79d.

The latest Colombo average prices available, quoted from *The Ceylon Tea Market Report*, 26th. July, 1938, of the Colombo Brokers' Association, are as follows, in rupee cents per lb.: High Grown Teas 79 cents, Medium Grown Teas 72 cents, Low Grown Teas 64 cents.

Coffee.—Palembang coffee prices were lower than in June; from \$10 to \$11 per picul, depending on quality, was quoted throughout the month. Sourabaya coffee appreciated sharply, averaging from \$13.75 to \$14.50 per picul. Average prices in the previous month were, per picul, Palembang \$11.85 to \$13.10, Sourabaya \$6.70 to \$8.65.

Prices in Singapore for other varieties of coffee were quoted throughout the month at (per picul): Liberian \$14.50, Excelsa \$9.50, Robusta \$6.00.

Spices.

Arecanuts.—Prices of splits and wholes appreciated slightly, while slices showed a considerable advance on June quotations. The range of average Singapore prices—depending on quality—during July were as follows:—Splits \$4.62 to \$7.44; Red Whole \$4.69 to \$6.05; Sliced \$8.31 to \$11.75 per picul.

The average of Singapore Chamber of Commerce quotations per picul were:—Best \$7.32, Medium \$6.88, Mixed \$6.20.

Pepper.—Prices remain low on utter lack of demand. Average Singapore prices per picul in July were as follows:—Black \$8.22, White \$13.65, Muntok \$13.90, as compared with \$8.06, \$13.44 and \$13.69 respectively in June.

Nutmegs.—Prices of both 110's and 80's dropped early in the month, but recovered during the latter part of July. The average price per picul for both 110's and 80's were \$28.60, as compared with \$30 in June.

Mace.—The closing price of Siouw mace in June was \$82 per picul; the price dropped another \$2 in July, the average price being \$80.40. Amboina dropped from \$68 per picul to \$62, the average price being \$63.20 per picul. Corresponding average prices in June were \$86 and \$71 per picul respectively.

Cloves.—Nominal prices were again quoted throughout the month at \$40 per picul for both Zanzibar and Amboina cloves.

Cardamoms.—The latest available price of green cardamoms as given in *The Ceylon Chamber of Commerce Weekly Report* of 25th July, 1938, is from Rs. 1.20 to Rs. 1.34 per lb.

Miscellaneous.

Derris.—The market conditions for derris remained unchanged, root sold on rotenone basis being quoted at \$22 per picul, and on the basis of ether extract \$14 per picul.

Gambier.—Block gambier was quoted throughout July at the previous month's figure of \$7.50 per picul. Cube No. 1 dropped 50 cents to stand for the greater part of the month at \$15 per picul, the average price being \$15.10 per picul.

Tapioca.—Tapioca was quoted throughout July at the following figures per picul:—Flake Fair \$4.10, Seed Pearl \$3.90, Medium Pearl \$4.75, as compared with June's average prices per picul of \$4.10, \$3.95, and \$4.75 respectively.

Sago.—Pearl, Small, Fair was quoted throughout July at \$3.75 per picul. Small fluctuations of price of Flour, Sarawak Fair were experienced the price ranging between \$2 and \$2.10 per picul, with an average price for the month of \$2.05. Average prices in June were \$3.56 and \$1.79 per picul respectively.

Tobacco.—Uncured leaf was usually sold at prices between \$2 and \$7 per picul. Cured leaf prices varied widely according to the district and to quality. In general, however, the range of prices per picul was as follows:—grade I \$30 to \$60, grade II \$25 to \$50, grade III \$16 to \$30. Kelantan prices for prepared tobacco remain high: grade I \$100 to \$160, grade II \$80 to \$128, grade III \$60 to \$112. On the other hand, Penang and Kedah prices were low I \$34 to \$38, II \$25 to \$28, III \$16 to \$18.

The above prices are based on London and Singapore daily quotations for rubber; on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports and certain coffee prices are kindly supplied by Messrs. Guthrie & Co. Ltd., Kuala Lumpur; the Singapore prices for imported coffee and arecanuts by the Lianqui Trading Company of Singapore, and derris prices by Messrs Hooglandt & Co., Singapore.

1 picul = 133 $\frac{1}{3}$ lbs. The Dollar is fixed at two shillings and four pence.

Note.—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57, Trafalgar Square, London, W.C. 2.

GENERAL RICE SUMMARY*

June 1938.

Malaya.—Imports of foreign rice during June were 68,201 tons† and exports 13,489 tons, net imports being 54,712 tons as compared with 44,958 tons in 1937.¶

Of the June imports 48 per cent. were consigned to Singapore, 20 per cent. to Penang, 7 per cent. to Malacca, 18 per cent. to the Federated Malay States and 7 per cent. to the Unfederated Malay States. The foreign imports by countries of origin were as follows (in tons, percentages in brackets): Siam 43,168 (63.3), Burma 22,362 (32.8), French Indo-China 1,431 (2.1), other countries 1,240 (1.8).

For the first half year 1938, total imports of rice into Malaya amounted to 398,368 tons of which 63.1 per cent. was Siam rice and 32.8 per cent Burma rice. For the period January to June 1937, the total imports were 322,803 tons. Net imports of rice for the inclusive period January to June 1938 were 302,270 tons, as compared with 264,344 tons in 1937.

Of the exports during June 1938, 77 per cent. were consigned to the Netherlands Indies and 23 per cent. to other countries. The various kinds of rice exported were as follows (in tons, percentages in brackets): Siam 11,035 (81.8), Burma 2,026 (15.0), French Indo-China 347 (2.6) parboiled 44 (0.3), local production 37 (0.3).

India and Burma.—Foreign exports from India for the period January to May 1938 were 119,000 tons as compared with 573,000 tons in 1937, a decrease of 79.2 per cent. Of these, 4.2 (4.6) per cent. were to the United Kingdom 6.7 (6.6) per cent. to the Continent of Europe, 35.3 (26.5) to Ceylon, 5.1 (24.1) to Straits Settlements and Far East, and 48.7 (38.2) per cent to other countries. The percentages in brackets are for 1937.

Burma's exports from 1st January to 22nd June totalled 1,928,423 tons as compared with 1,891,176 tons in 1937, an increase of 2 per cent. Of these, 42.5 (46.7) per cent. were to India, 9.1 (8.3) per cent. to the United Kingdom, 8.0 (9.1) per cent. to the Continent of Europe, 10.5 (10.4) per cent. to Ceylon, 13.7 (12.0) per cent. to the Straits Settlements and the Far East, and 16.2 (13.5) per cent. to other countries. The figures in brackets are for 1937.

Siam.—Exports of rice and rice products from Bangkok during April were 152,451 tons as compared with 75,398 tons in 1937.

Japan.—According to the official estimate of 29th June, 1938, of the first Formosan rice crop for the season 1938, the area under rice, at 713,189 acres, shows a market decrease, the figure for 1937 being 729,239 acres, and that of 1936 744,827 acres.

* Abridged from the Rice Summary for June, 1938 compiled by the Department of Statistics, Straits Settlements and Federated Malay States.

† Ton = long ton (2,240 lbs.)

¶ It is to be understood throughout the Summary that all comparisons and percentage increases or decreases are in relation to the corresponding period of 1937.

Conditions of growth have been good, and estimated production shows an increase of 5.4 per cent. over the actual crop of last year. The policy of reducing acreage to allow for substitute crops, while maintaining* the production level, continues to have effect.

The estimated production of the first crop of 1938 is 652,066 tons, as compared to actual production in 1937 of 618,711 tons and in 1936 of 664,559 tons.

French Indo-China.—Entries of padi into Cholon during the first half year 1938 were 697,041 tons, as compared with 856,024 in 1937, a decrease of 18.6 per cent. Exports of rice during the same period were 694,620 tons, as compared with 786,334 in 1937, a decrease of 11.7 per cent.

The Saigon rice report for June states that the demand for rice from abroad (non-French countries) has decreased, owing to the high prices ruling, and the same tendency was noticeable in the French demand, after it had remained strong during the whole month.

Ceylon.—Imports of rice during the first half year 1938 were 279,364 tons, as compared with 274,089 tons in 1937, an increase of 1.9 per cent. Of these imports, 17.3 (17.0) per cent. were from British India, 71.5 (69.2) per cent. from Burma, 0.3 (0.1) per cent. from the Straits Settlements, and 10.9 (13.7) per cent. from other countries. The percentages in brackets are for 1937.

Europe and America.—Shipments from the East to Europe from 1st January to 10th June totalled 710,852 tons, as compared with 641,511 tons in 1937, an increase of 10.8 per cent. Of these shipments, 46.0 (47.2) per cent. were from Burma, 44.6 (44.4) per cent from Saigon, 7.6 (5.8) per cent. from Siam and 1.8 (2.6) per cent. from Bengal. The figures in brackets are the corresponding percentages for 1937.

Shipments for the Levant from 1st January to 9th June were 21,840 tons, as compared with 7,619 tons in 1937, an increase of 186.7 per cent.

Shipments for Cuba, West Indies and America from 1st January to 25th May were 88,828 tons as compared with 130,651 tons in 1937, a decrease of 32.0 per cent.

MALAYAN AGRICULTURAL EXPORTS, JUNE, 1938.

PRODUCT.	Net Exports in Tons				
	Year 1937	Jan./June 1937	Jan./June 1938	June 1937	June 1938
Arecanuts ...	30,084	16,836	22,257	3,502	4,514
Coconuts fresh † ...	95,223†	42,418†	50,453†	9,439†	14,039†
Coconut oil ...	39,762	18,020	21,259	3,467	3,674
Copra ...	75,592	27,573	18,442	5,263	3,455
Gambier, all kinds ...	1,955	989	734	139	122
Copra cake ...	15,026§	6,095§	3,340§	285§	954§
Palm kernels ...	7,312	2,768	4,302	233	710
Palm oil ...	42,787	20,614	25,570	4,325	4,971
Pineapples canned ...	80,502	46,728	42,698	10,296	9,009
Rubber ¶ ...	503,127¶	230,741¶	203,242¶	51,569¶	37,793¶
Sago,—flour ...	15,478	8,297	1,687	144*	532*
„ —pearl ...	3,759	1,471	1,939	132	240
„ —raw ...	8,256*	3,885*	3,046*	787*	279*
Tapioca,—flake ...	1,058	594	478	99	98
„ —flour ...	2,393*	855*	2,087*	27	447*
„ —pearl ...	18,786	8,461	8,345	1,367	1,507
Tuba root ...	573	324	207	62	52

† hundreds in number.

* net imports.

¶ production.

§ gross exports.

MALAYAN PRODUCTION OF PALM OIL AND KERNELS

(In long tons, as declared by Estates)

Month 1938				Palm Oil		Palm Kernels	
				F.M.S.	U.M.S.	F.M.S.	U.M.S.
January ...	...	...	...	2,241.7	1,309.2	383.7	232.0
February ...	...	...	...	2,040.4	1,457.1	370.4	261.0
March ...	...	...	...	2,359.6	1,843.1	446.8	344.0
April ...	...	...	...	1,963.7	1,122.6	353.6	218.0
May ...	...	...	...	1,491.7	1,480.7	274.8	258.0
June ...	...	...	...	1,773.5	1,781.2	315.9	247.0
Total ...				11,870.6	8,993.9	2,145.2	1,560.0
Total January to June, 1937 ...				10,375.3	8,321.3	1,897.4	1,385.7
Total for the year 1937 ...				27,733.5	17,932.8	5,094.7	2,811.4

Stocks on estates as at 30th June, 1938 were: palm oil 2,424 tons, palm kernels 581 tons.

MALAYAN RUBBER STATISTICS

ACREAGES OF TAPPALE RUBBER ACTUALLY TAPPED AND NOT TAPPED ON ESTATES OF 100 ACRES AND OVER,
FOR THE MONTH ENDING 30TH JUNE, 1938.

STATE OR TERRITORY (1)	Estimated Acres of Tappable Rubber (2)	Actual area tapped during the month Acreage (3)	Percent- age of (3) to (2) (4)	ACREAGES OF TAPPABLE RUBBER NOT TAPPED						AREA OF TAPPABLE RUBBER NEVER BEEN TAPPED		Total area not tapped (5) + (7) + (9) (13)	Percent- age of (13) to (2) (14)		
				ESTATES WHICH HAVE ENTIRELY CEASED TAPPING		On estates which have partly ceased tapping				Acreage (7)	Percent- age of (7) to (2) (8)			Acreage (9)	Percent- age of (9) to (2) (10)
				Acreage (5)	Percent- age of (5) to (2) (6)	Otherwise than under rotational systems		Acreage (11)	Percent- age of (11) to (2) (12)						
						Acreage (13)	Percent- age of (13) to (2) (14)								
S. S.—															
Province Wellesley ...	43,302	22,015	50.8		662	1.5	12,155	28.1	8,470	19.6	409	0.9	21,287	49.2	
Malacca ...	121,868	66,077	54.2		2,692	2.2	22,148	18.2	30,951	25.4	2,114	1.7	55,791	45.8	
Penang ...	2,488	1,313	52.8		258	10.4	857	34.4	60	2.4	36	1.4	1,175	47.2	
Singapore ...	32,384	17,004	52.5		3,792	11.7	6,447	19.9	5,141	15.9	103	0.3	15,380	47.5	
Total S.S. ...	200,042	106,409	53.2		7,404	3.7	41,607	20.8	44,622	22.3	2,662	1.3	93,633	46.8	
F. M. S.—															
Perak ...	286,794	169,458	59.1		3,944	1.4	57,771	20.1	55,621	19.4	6,775	2.4	117,336	40.9	
Selangor ...	324,476	209,347	64.5		5,983	1.9	45,213	13.9	63,933	19.7	6,279	1.9	115,129	35.5	
Negri Sembilan ...	254,088	155,347	61.1		6,996	2.8	40,941	16.1	50,804	20.0	7,493	2.9	98,741	38.9	
Pahang ...	86,420	53,296	61.7		3,528	4.1	19,224	22.2	10,372	12.0	6,342	7.3	33,124	38.3	
Total F.M.S. ...	951,778	587,448	61.7		20,451	2.2	163,149	17.1	180,730	19.0	26,889	2.8	364,330	38.3	
U. M. S.—															
Johore ...	475,817	309,891	65.1		8,832	1.9	88,353	18.6	68,741	14.4	33,338	7.0	165,926	34.9	
Kedah ...	195,949	125,668	64.1		6,511	3.3	23,994	12.3	39,776	20.3	6,941	3.5	70,281	35.9	
Kelantan ...	31,188	21,269	68.2		223	0.7	5,711	18.3	3,985	12.8	1,934	6.2	9,919	31.8	
Trengganu (b) ...	4,817	3,182	66.1		nil	nil	74	1.5	1,561	32.4	74	1.5	1,635	33.9	
Perlis (c) ...	1,371	858	62.6		216	15.8	257	18.7	40	2.9	84	6.1	513	37.4	
Brunei ...	5,689	2,988	52.5		nil	nil	1,885	33.1	816	14.4	281	4.9	2,701	47.5	
Total U.M.S. ...	714,831	463,850	64.9		15,782	2.2	120,274	16.8	114,919	16.1	42,652	6.0	250,975	35.1	
Total MALAYA ...	1,866,651	1,157,713	62.0		43,637	2.4	325,030	17.4	340,271	18.2	72,203	3.9	708,938	38.0	

Notes:—(a) The acreage shown in column (11) is included in columns (5) and (7).
(b) Registered companies only.
(c) Rentered quarterly.

MALAYA RUBBER STATISTICS Table I.

ACREAGE, STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX, FOR THE MONTH OF JUNE, 1938 IN DRY TONS.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over			Production by Estates of less than 100 acres estimated 2			Imports			Exports including re-exports			Stocks at end of month			Consumption 3	
	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to June 1938	during the month	Jan. to June 1938	during the month	Jan. to June 1938	Foreign	From Malay States & Labuan	From Malay States & Labuan	Foreign	Local	Local	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to June 1938
MALAY STATES:—																				
Federated Malay States	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Johore	...	8,912	14,762	10,820	68,801	7,867	33,650	Nil	Nil	Nil	Nil	10,336	6,739	75,761	24,676	...	9,944	15,125	17	92
Kedah	...	3,633	6,164	4,952	31,787	5,094	19,948	Nil	Nil	Nil	105	2,782	9,354	19,148	13,169	...	5,005	6,152	...	...
Perlis	...	393	3,937	2,601	17,166	1,039	5,461	Nil	Nil	Nil	Nil	1,484	2,255	11,130	11,465	...	325	3,836	...	...
Kelantan	...	19	32	11	82	25	139	Nil	Nil	Nil	Nil	Nil	Nil	Nil	200	...	20	26	...	...
Trengganu	...	606	385	383	2,181	1,127	4,001	Nil	Nil	Nil	Nil	281	1,032	1,647	4,433	...	798	390	...	...
Brunei	...	55	50	211	1,620	105	810	Nil	Nil	Nil	Nil	Nil	316	Nil	2,430	...	55	50	...	...
Total Malay States	...	15	59	54	280	111	429	...	...	...	...	...	185	...	730	...	Nil	54	...	...
S. SETTLEMENTS:—																				
Malacca	...	13,613	25,389	19,032	121,917	15,368	64,438	Nil	Nil	Nil	105	15,083	16,522	107,686	75,103	...	16,147	25,633	17	92
Penang	...	2,326	1,513	1,082	6,976	1,172	3,808	Nil	Nil	Nil	...	2,473	...	14,926	...	...	2,400	1,655	...	...
Singapore	...	5,778	704	391	2,577	345	1,457	Nil	Nil	Nil	...	6,436	...	45,764	...	...	2,454	738	...	...
Labuan	...	2,676	5,148	13	112	141	570	2,414	13,939	13,341	77,397	18,266	Nil	112,073	...	...	2,754	5,751	7	...
Total Straits Settlements	...	3,733	29,053	241	133	924	88	382	11,939	65,020	281	Nil	Nil	Nil	...	...	4,558	31,675	207	25
Total Malaya	...	6,409	38,154	2,471	1,625	10,589	1,768	6,298	14,394	78,642	77,397	27,175	Nil	172,763	Nil	7,312	42,329	2,607	25	149
Total Malaya	...	6,409	51,767	27,850	20,657	17,136	70,736	14,394	13,939	78,642	77,502	42,258	16,522	280,449	75,103	7,312	58,476	28,240	42	241

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federation Malay States	S'pore	Penang	Prov. ince Wel's M'cca.	Johore	Kedah
	23	24	25	26	27	28
DRY RUBBER	8,882	30,475	5,570	4,625	4,122	121
WET RUBBER	1,062	1,200	181	273	883	204
TOTAL	9,944	31,675	5,751	4,903	5,005	325

TABLE III
FOREIGN EXPORTS

PORTS	For month	Jan. to June 1938
	29	31
Singapore	27,959	184,967
Penang	9,887	67,421
Port Swettenham.	4,037	26,752
Malacca	275	1,309
MALAYA	42,258	280,449

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	Jan. to June 1938
	32	34
Malay States	...	182,405
Straits Settlements	31,575	15,738
MALAYA	34,382	198,143

- Notes:—
1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained.
 2. The production of estates of less than 100 acres is estimated from the formula: Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month + Consumption, i.e., Column [7] + [14] + [17] + [18] + [19] + [20] - [2] - [3] - [4] - [5] - [9] - [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
 3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
 4. Columns (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
 5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication therefore, is always the most reliable.
 6. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S. S. and F. M. S., at Singapore on 22nd June 1938.

METEOROLOGICAL SUMMARY, MALAYA, JUNE, 1938.

LOCALITY.	AIR TEMPERATURE IN DEGREES FAHRENHEIT						EARTH TEMPERATURE		RAINFALL						BRIGHT SUNSHINE.					
	Means of		Mean of A and B	Absolute Extremes				At 1 foot	At 4 feet	Total.		Most in a day.	Number of days.					Total.	Daily Mean.	Per cent.
	A.	B.		Min.	Highest	Lowest	Min.						Lowest	Max.	Highest	Precipitation .01 in or more	Precipitation .04 in or more			
	Max.	Min.	°F	°F	°F	°F	°F	°F	in.	mm.	in.	in.						hrs.	hrs.	
Railway Hill, Kuala Lumpur, Selangor	91.2	72.3	81.7	94	70	88	74	84.7	85.4	2.68	68.1	0.76	10	8	2			227.15	7.57	61
Bukit Jeram, Selangor	90.8	73.0	81.9	94	70	88	75	86.8	87.6	2.76	70.1	1.22	6	3	2		1	256.75	8.56	69
Sitiawan, Perak	90.8	72.8	81.8	94	69	89	77	85.1	85.5	3.18	80.8	1.44	6	6	1			254.65	8.49	69
Ipoh Aerodrome, Perak	90.9	72.3	81.6	94	69	88	75	84.0	85.0	5.61	142.5	1.78	8	8	5		1	218.50	7.28	59
Temerloh, Pahang	91.6	72.6	82.1	94	70	85	75	86.7	87.2	2.84	72.1	1.58	7	6	2	7		227.25	7.57	61
Kuala Lipis, Pahang	90.6	72.2	81.4	93	68	86	75	85.1	85.8	1.43	36.3	0.86	8	5	3	20		180.95	6.03	49
Kuala Pahang, Pahang	87.9	74.8	81.3	90	72	82	79	87.0	88.0	6.42	164.3	2.78	6	5	4		4	249.85	8.33	68
Kallang Aerodrome, S'pore	87.3	77.5	82.4	89	71	80	82	83.8	84.3	6.05	153.7	1.70	9	7	2		2	247.80	8.26	68
Bayan Lepas Aerodrome Penang	88.2	74.5	81.3	90	71	85	77	84.7	85.4	4.61	117.1	2.22	13	7	2		2	229.30	7.64	62
Bukit China, Malacca	86.6	74.3	80.5	88	70	81	79	84.7	85.7	3.94	100.1	2.42	10	8	3		4	232.15	7.74	63
Kluang, Johore	88.9	71.4	80.1	92	69	77	75	82.7	83.2	2.64	67.1	0.75	12	11	1	4		201.05	6.70	55
Bukit Lalang, Mersing, Johore	87.6	72.2	79.9	90	70	77	75	83.2	83.1	2.44	62.0	0.57	10	8	1		2	212.25	7.07	57
Alor Star, Kedah	88.7	74.2	81.5	92	71	84	76	85.1	86.5	9.79	248.7	2.70	12		2	1	1	183.35	6.11	49
Kota Bharu, Kelantan	90.0	73.6	81.8	94	71	84	76	84.8	85.6	3.26	82.8	1.17	10	6	3		1	188.45	6.28	51
Kuala Trengganu, Trengganu	89.3	73.5	81.4	93	70	85	75	84.5	86.2	4.99	126.7	1.68	9	8	4		1	209.40	6.98	56
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft	75.4	63.3	69.3	79	62	72	65	73.1	73.3	2.71	68.8	2.45	7	3	5	7		221.80	7.39	60
Cameron Highlands, Tanah Rata, Pahang 4750 ft.	73.0	54.8	63.9	76	49	69	59	70.9	70.9	3.34	84.8	1.26	13	11	2			178.85	5.96	48
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft.	73.1	59.8	66.5	77	58	68	61			3.17	80.5	1.39	13	9				194.05	6.47	52

Compiled from Returns supplied by the Meteorological Branch, Malaya.

